THIS WEEK'S National Petroleum NEWS

Index to Coming Meetings

Kentucky Petroleum Marketers Association, Brown Hotel, Louisville, **May 6, 7.**

Wisconsin Petroleum Association, Hotel Pfister, Milwaukee, May 14.

National Oil Scouts Association of America, San Antonio, Tex., May 19, 20.

Natural Gasoline Association of America, Mayo Hotel, Tulsa, May 20, 21, 22.

Mid-Continent District, American Petroleum Institute, Division of Production, Mayo Hotel, Tulsa, May 23 and 24.

West Virginia Oil Marketers Association, Daniel Boone Hotel, Charleston, W. Va., June 12, 13.

American Society for Testing Materials, Atlantic City, N. J. June 23 to 27.

North American Gasoline Tax Conference, King Edward Hotel, Toronto, Ont., Sept. 2, 3, 4.

National Safety Council, Petroleum Section, Pittsburgh, Pa., Sept. 29 to Oct. 4.

Big Four State Jobbers Convention, (Missouri, Iowa, Kansas and Nebraska) Kansas City, Mo., Oct. 14, 15, 16.

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A. C. CARPENTER of Ottawa, Kan., head of the Lesh Oil Co., is one of old-time Kansas Independent jobbers.

Back in the years when the World war was getting under way he was one of the jobbers gathered in a hotel room in Chanute, Kan., at the early meetings of the Kansas Oil Men's Association. He has been interested in the association through the years, and at the latest convention was re-elected for his sixth consecutive term.

Mr. Carpenter organized the Lesh Oil Co. in 1910, in his home town of Paola. Mr. Lesh was his father-in-law, and operated a refinery at Arkansas City until his death in 1919. In 1913 Mr. Carpenter moved his office to Ottawa. The company now has a dozen bulk plants in eastern central Kansas, extending as far west as Emporia.

Flowers are a hobby and he takes much pride in the landscaping about his large home in Ottawa.

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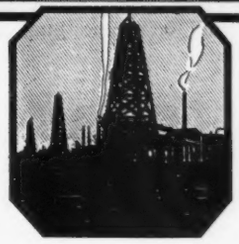

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Automotive Developments Held Back By Lack of True Anti-Knock Fuels

By Charles F. Kettering*

(An Address before the National Petroleum Association, Cleveland, April 23)

THE limiting factor of what can be done with the internal combustion engine is purely a matter of the oil industry solving the problem of detonation in the fuels it provides, C. F. Kettering, president of the General Motors Research Corp., told the National Petroleum Association in Cleveland April 23.

Lighter engines of increased horsepower, and of greatly increased fuel economy are waiting for motor fuels with detonation entirely eliminated to become a principal source of power for both transportation and stationary needs in the future, said this noted automotive engineer.

"We can equal or excel Diesel engine performance in the ordinary carburetor engine if we had non-detonating fuel," he said. " . . . To build engines of 3500 horsepower, carburetor type, would not be difficult at all."

Build a fuel molecule with the same degree of accuracy and faithfulness to standards that the motor car manufacturer puts into the parts of his car, he told the refining industry.

THE motor car industry has developed on three basic materials —rubber, alloy steels and petroleum products. As a matter of fact, we think rubber is more important than the other two, because you could run an automobile on pulverized fuel, with some kind of ordinary carbon product providing lubricating oil. Or you might get along with gas oil, or something like that; but you can't run without rubber. However, the introduction of alloy steels and petroleum fuels and lubricants has been very largely responsible for the tremendous increase in utilization of the motor vehicle.

Now, we figure, again looking from the outside in, that the rubber fellows, from the standpoint of utilization development, have gone somewhere between 50 and 75 per cent of the way we could reasonably hope they could go.

There have always been three phases in every industry—the question of production, marketing, and of specific utilization, or fitness of the product for the particular duty it has.

I have, some place in my papers at Detroit, a letter from a friend of mine in the West, which states that one of his employes some 30 years ago was given $80 in cash, a suit of clothes and a new overcoat for dumping 50 gallons of gasoline in the river without being caught by the game commissioner. From the point where gasoline was a useless by-product, it has come into the class where it has become a very necessary article, in very great demand. I mention this to get the background. We came into the use of gasoline as motor power for internal combustion engines largely as an accidental crossing of two roads. You folks were looking for an outlet for your goods, and the fellows boring holes and putting pistons in blocks of steel to make an engine found it would run with that, each one working independently of the other. The motor car manufacturer was not worrying about the fuel and the fuel fellow was not worrying about the motor car.

I made mention of the utilization factor. We feel that rubber falls somewhere between 65 and 75 per cent of the way we can hope to get. In the steel industry we feel they have gone somewhere between 40 and 50 per cent of the way, in doing what can be hoped for, because we are just learning a little bit about what can be done in the alloying of steels, hardening, prevention of fatigue, and all that sort of thing. They have also had their manufacturing problems and marketing problems, which have been handled as the commercial demand suggested.

In the petroleum industry, we feel you have done perhaps a 110 per cent job in manufacturing. I think, in fact, anybody driving along our national highways will appreciate that. You couldn't run out of gasoline on a national highway if you tried. Just shift out the clutch and let the car roll and it will roll into a filling station. The one thing you have not done is to get out menu cards for fill-

*President General Motors Research Corp.

ing stations, which I think are necessary. You wouldn't expect a man to go into a restaurant and just say "I want something to eat."

On the utilization end we have figured the oil industry has done something between 30 and 40 per cent of the job. In discussing that with some of your members, they said that was too high, but, being generous minded, we'll let it go at between 30 and 40 per cent.

The limiting factor of what you can do with the internal combustion engine is purely a question of fuel. We who have spent a good many years with this type of engine feel that, as far as the utility of the internal combustion engine is concerned, it is in a very undeveloped state.

A great many years ago we undertook in our laboratories, through force of pressure brought to bear on us, to develop ignition for automobiles. We got into what was called the spark knock and we got into a lot of trouble on account of not being able to make an automobile run as good this year as it did last year—not blaming it on the type of ignition. Through that incident we tried to make a set of primary causes.

That is still the all-important problem in the internal combustion engine. It is still the all-important problem of the high powered aeroplane engine, whether you gentlemen of the oil industry can remove detonation from the fuel. The things you can do with the internal combustion engine, if that can be done are not possible to predict. I believe we can work out of our factories some form of oil engines that can become competitors for any known source of power today. In other words, the ability to produce power at low cost is absolutely dependent on the character of the fuel.

We do not regard the fuel which we buy today at a filling station as being a product outside the automobile at all. We regard it as part of that automobile, because the automobile does not function unless it is there. If you were to take the variations that exist in that product as we buy it today over various places in the country, that variation would compare to the variation in the parts you would find in any large scrap heap in the city of Cleveland—from stoves to ball bearings.

Suppose I were to take one of our new 16-cylinder Cadillacs and say to the car maker "I am perfectly willing to use everything in the car but the piston pins. I won't buy those, but everything else I will take." Then suppose I were to go to the hardware store and buy a piece of iron and saw off some pins and put them in the engine and put the car on the road. I would come back and complain that it would not work right and so forth and so forth.

Charles F. Kettering

It would be perfectly justifiable of the car manufacturer to say that the pins I put in were not the right material. It was pure iron, to be sure—the purer the worse sometimes—while the piston pins he recommended are the right pins. I might say that ought not to make all the difference it does, that the pin I put in was only a 64th inch too small and a little bit too soft, and so on. But the fact of the case is no one would expect the car to function with that change. If we could build today a fuel molecule with the same degree of accuracy of our piston pins, the function of that motor would be just as much improved as with the change of the two piston pins. Motor cars today function very well, but not as well as they could if we had this one particular thing removed from our fuel—detonation.

There is a great deal of discussion on the subject of the Diesel engine. Most people regard the Diesel engine as being able to run on crude oil. That is perhaps holding back its use more than anything else. You oil men know that it would be a very, very voracious engine that would run satisfactorily on crude oil, especially the smaller Diesels. They point out to you the lower fuel costs, such as 7 cents a gallon, and its greater fuel economy as a reason for tremendous investigation and expenditure in the development of Diesel type engines.

We can equal or excel Diesel engine performance on the ordinary carburetor engine if we had non-detonating fuel. In fact, we have run many tests of engines in which we have gotten 0.35 to 0.38 pounds of fuel per horsepower hour, which is what we could expect with the Diesel engine. With the detonation removed the economy in the two cases would be the same.

I think you know that there is very little difference in the cost of production of those two gasolines. It is purely accidental that some of our fuels have detonation and some do not. I don't think the Lord figured on internal combustion engines when He made up His mixtures. We know from a long series of laboratory investigations that it is highly probable and altogether possible that you can make those fuel molecules just about what you want them to be.

It is very significant that, in the old days, we discussed the question of volatility as being the controlling factor of what gasoline should be, in other words, high or low gravity. Everybody in the oil business today knows gravity has nothing to do in the matter now, that we can take certain heavy fuels and they are very much better, so far as detonation is concerned, than the most highly volatile gasoline you can get.

It is purely a question of the molecular structure. We believe also, from experimental work, that it is reasonable to expect that this molecule can be made to shift into about the type you would like it. In our lightest motors today, for aviation in particular, we might expect as much as 35 to 40 per cent reduction in weight for the same horsepower, somewhere between 25 and 30 per cent increase in fuel economy, if absolutely non-detonating fuels could be provided.

So, looking at it from the engineer's standpoint, the one point that prevents us from accomplishing those things is the fact we do not have

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The Editors' Viewpoint

National Petroleum News

The Oil Companies Now Finance a Lot of Trouble

IT IS really unbelievable what oil companies, good ones too, will do these days for business. Their high executives may raise their hands to the heavens at meetings of the American Petroleum Institute and swear to their dying day they will support the code of ethics, and loudly denounce others for doing fool things; but these same executives, when they get back home, seem to be sitting up nights trying to find a new way to violate sound business practices.

Now comes the story that good oil companies, who should know better and should be setting examples of sound methods, are financing taxicab companies in exchange for their gasoline and oil business. Yes, and some of the companies who have helped on their financing racket are Standards. The promotor of these taxicab lines is having such success getting oil company money that he expects to have 4000 Ford cabs running in various cities in a year. He now has 800, thanks to oil company generosity.

These oil companies are charging less for this financing than the regular financing companies do, that is why this promotor puts it up to the oil companies. Of course the oil company has to allow all the usual discounts on the oil and gasoline sold to its own taxicabs.

Words fail in condemning such a practice. How these oil executives can call themselves business men after such a deal is beyond one. But maybe they don't.

This probably looks like smart business, at first glance, but where does it lead to? In the first place the oil company is in the taxicab business and owns the cabs which are rapidly deteriorating. That is why the finance companies have to charge what they do on cab lines. Judging from the looks of most cabs, and the way cab lines come and go, there can't be much profit in the business as it is ordinarily operated. But oil companies, it seems, rush in where financing companies won't.

But the troubles of owning a cab line are the least to the oil company. The next step is to finance the purchase of trucks for gasoline customers and it probably would be a hot idea if the oil companies financed the purchase of cars for all of the 100,000,000 people in this country who have not got any now. Then, when that job is completed, the oil companies might do the same for the rest of the world. That would create a tremendous market for gasoline that would put the industry on its feet and keep it there for years to come.

The more one thinks of this brilliant idea the more it grows. For instance, these big generous oil companies could finance the railroads in return for the lubricating business; could finance power houses, yes all sorts of plants that use a petroleum product. Then there is the poor farmer who always seems to be in need of money. An oil company could cinch the farmers business by financing his machinery and, if the farmer is hard pushed, finance even his crops.

There is just no end to this idea.

We also hear of men promoting service stations by selling part of the stock to oil companies who get the business. If an oil company has to wait for some outsider to furnish it service stations, at his terms, the sooner that oil company quits business the better, because its going to quit any way.

To repeat, it is just unbelievable what oil companies will do to get business.—W. C. P.

How Auto Industry Works Cooperatively

THOSE of us who heard Mr. Alfred Reeves, general manager of the National Automobile Chamber of Commerce, tell in Cleveland last week how the automobile industry has benefitted through cooperative association work must have realized that the oil industry will have to readjust its ideas eventually on this kind of industrial activity.

The automotive industry was far sighted enough to see that its individual members would profit as the entire industry advanced in making better and cheaper cars for the public and as it took an active hand in the broadening of markets and the opening of new markets for its cars.

If Mr. Reeves' remarks can be taken at their face value, and most presumably they can, contrast the way in which individual manufacturers have helped each other in the improving of their product and making it cost less to the public with the way in which what were thought to be new refining methods have been jealously guarded among the oil companies. Fortunately, there is a tendency now, among the new managements of some companies to interchange this information more freely.

For one thing, the car manufacturers pool their patents, so that, except practically on current improvements, one man is free to use the inventions of his competitors, upon payment of royalties. The automotive industry has thus advanced evenly as an industry in the improving of its cars. It has saved itself energy and money through litigation. It has made it possible for parts to be made to standards for many companies, in large enough volume so that the cost of making those parts is reduced.

Mr. Reeves brought out that some 1500 patents are covered in the industry's cross licensing arrangement; also that a new agreement extending for ten years has just been entered into. At the head of the list of signers of that agreement, said Mr. Reeves, were such men as President Sloan, of General Motors; President Erskine, of Studebaker; President Nash, of Nash Motors and so on.

On interchange of information, Mr. Reeves brought out that one automobile company, learning that another company was going to try out a type of brake on which the former company had done considerable experimental work, sent for the engineers of the other company to come to its plant and get the benefit of its experience. In another case, one company sent for the engineering department of another company which was planning to put up a new plant, and turned over to the engineers the blueprints and plans of its own similar plant.

(*Continued from Page* 28)

national distribution of such fuels. You are all aware that benzol has no detonation at all. You can run up compressions with that fuel until you get automatic ignition without any sign of detonation whatever. With these limited amounts of this fuel we have been able to make experimental tests and prove the point I am stating.

I have a fair knowledge of refining operations and what can be done commercially, and know it is possible to take detonating fuels and, with expensive operations, produce rather good fuels.

It is perfectly evident to my point of view that it is a question of time until entire railroads go to the internal combustion engine just as soon as you in the oil industry can give us the type of fuel to get the horse power necessary for a given space we have got to build in.

Could Build Carburetor Engines Of 3500 Horse Power

To build engines of 3500 horse power, carburetor type, would not be difficult at all. They can be run at very high speeds, relatively high speeds. To build very high speed Diesel engines they must be heavy. Understand, I am in no way antagonistic to Diesel engines, not at all. I have had quite a lot of experience with them and am a very good Diesel engine mechanic in consequence.

The future—and when I speak of the future of the internal combustion engine I include with it the high speed Diesel engine, would be an almost realized fact if we had non-detonating fuels. I cannot see why, except under extreme conditions, every thing in the transportation line should not be oil propelled devices, for simplicity and durability, before any other type of motive power.

Two other factors in operation of automotive vehicles you are interested in, lubricating oils and transmission and rear axle, oils and greases. In lubricating oils there are three problems. First, to get the engine to start in cold weather. It is more difficult to crank and after once turned over there is the question of feeding into the pump, and if we can't establish circulation after the engine is started, we get into trouble.

We have that problem on one hand against the other problem of high specific oil consumption at very high speeds, in very hot weather. We are not unmindful that we in the automotive fields have a part to play in some of these things, and, as far as the engineering division of the motor industry is concerned, it is getting a lot of consideration. We can perhaps help on the high specific consumption and high speeds in hot weather, but we don't think so much about the other problem. Some work has been done in the oil industry in the last two or three years that looks very promising, however.

The paper by A. M. Maxwell, vice president of the Standard Oil Co. of Ohio, presented before the National Petroleum Association meeting at Cleveland, will be published in part in the May 7 issue of NATIONAL PETROLEUM NEWS.

On the question of transmission and lubricating oils, one of the things the oil companies have done has been helpful, the adopting of S.A.E. numbers on their oils. Language does not always apply to the same things. Light, medium and heavy in one place is entirely different than light, medium and heavy in another place. Showing also the proper S.A.E. numbers has helped that.

Classes of Transmission Lubricants Defined

In transmission oils and greases we have a very much more mixed condition even than in lubricating oils. With lubricating oil, unless a man has a trusted man in some filling station, when he starts out across country by himself you can't count on what will happen to him. In the transmission lubricants we have a wide variation. There are two broad classes among users of transmission lubricants. There are those who want the perfectly standard, routine, pure petroleum products. Their argument is that is the kind to have because you can get them the world over. They believe we should build our automobiles to meet this particular condition.

Then there is the special lubricant fellow, who if he has any merit in his special lubricants, argues that they have sufficient marketing representation and there should be no trouble in getting them. Between these two, the man who wants to furnish natural products, and the fellow who has something special, is a whole flock of patent medicines. This is bad medicine. The advertising man has free hand.

We have run tests in the past year which indicate tremendous possibilities in what can be done under high pressure lubricating conditions in transmissions and rear axles, and it does not matter whether a pure product or a blended product is used. The problem is to best lubricate those two for the service they have to meet.

Our situation in the motor car business has changed very rapidly in the past ten years. Ten years ago the maximum speed of an automobile engine was perhaps 24 to 25 hundred turns, and as for maximum rated speeds, I don't think any body had gone at a rate of 60 miles an hour. The advertising man said he had, and the speedometer said he had—but if you measured the miles you might find out differently.

Today the engine revolutions have gone up so it is quite common to find engines which turn up quite cheerfully and easily at 45 hundred turns. It is no trouble to go out and drive 60 miles an hour for any number of hours you want to. We have run 20,000 miles or better than 60 miles an hour on our proving ground track. In this question of speed, horse power, we have all been going up.

Looking a little into the future, it seems to me we all have a problem to work out together. I believe it is only a question of time until express highways come. I believe that, in the next ten years, we can have express highways across the United States. I guarantee that, if you want to carry the mail over 365 days a year with express highways and the motor cars we might be able to build, we could do it in fewer hours, via motor car, than any other known method. I mean 365 days in the year.

This motor car industry is just starting on the question of long distance transportation, because we are just learning what we can do with the roads. In a few sections of the country the roads are just mud wagon ruts. There was no trouble in turning with a horse and wagon, no danger of skidding, but today the question of curves, of width, and all that, is a very important matter. Consequently the study of highways, and long distance highways, is becoming more and more important every day. The oil industry does not feel particularly happy at what is called over-production. However, it is not alone in that problem. You know there are 120 million people in the United States, and that is where the difficulty happens to be. With long distance highways and all that sort of thing the fuel consumption will be greater, there will be more motor cars and more motor car orders and, therefor, this will all tend to develop business in general. But I want to say that I believe no transportation device in which you have got to carry your burden of fuel with you, will in the long run survive. I am absolutely sold on that.

Limiting Factor Today Is Detonation

Now, on this whole question of rubber tire transportation, we know what happened in the way of trucks and buses and the motor car in general. We know what is happening in the airplane business. What is the limiting factor there today? In talking to the designer, he says it's the motor, there isn't the right kind of motor. He doesn't mean that. You ask him how well his motors last and he'll give you a very fine report.

It might be interesting to you to know that, in some sections of the United States, an airplane motor will run for just about one-third of the maintenance cost as in other sections of the United States, based on aviation fuel. Operators in both sections are buying what they think is exactly the same thing. I won't mention at all

where the one-third comes from because I would not want the West Coast fellow to get conceited about the thing. I mention this because so much of this thing we allocate to another thing really goes back to a fundamental principle overlooked time and time again.

If you were outside the industry you would be surprised to see the number of patents, gadgets and this and that developed in particular localities to meet what they consider is the mechanical situation. We believe that the construction of a fuel molecule is just as much a piece of mechanism as the gas engine today. I think this would be of interest to the scientist today. If we build up an 8-carbon-atom molecule and put it through certain experimental tests, and take exactly the same thing and put it under the spectroscope, we will find exactly the same thing we are going to find by studying the mechanical molecule. Automotive engineers are particularly interested as far as being able to develop power in the internal combustion engine is concerned. They have to make a piece of machinery which goes out and functions, with parts that they do not furnish, namely the fuel. Therefore, they have to make a wide enough limit to take all that into consideration.

I tell you of the oil industry that our business, and your business, during the next 15 to 20 years, is going to depend on your ability to make a "go" or "no go" gauge fuel molecule. I am even willing to go so far as to say that I think that we can compete with any other source of power in the world today in stationary as well as in transportation engines. In other words, I am wholly enthusiastic about the future of the internal combustion engine.

Importance of Petroleum To Civilization

The public does not appreciate the enormous importance of the oil industry to the present day civilization. To my notion it is one of the great foundation stones on which American progress has been built. It touches everybody. You talk about the electric light. That doesn't touch anything like the number of people the gasoline can does. It not only touches everybody in America but in my opinion the gasoline can is going to come more nearly to creating a uniform civilization in this world than any other single thing. It increases the range of man's contacts more than any other thing.

Human nature is the same world over, and it doesn't matter in what country a man is parked or what language he speaks, he is able to make contacts, and, consequently, the field is opened up for the expansion of the industries in which we are mutually interested. I can conceive of nothing that has had the importance on all lines of work of the internal combustion engine.

The electric light and the telephone made their greatest advances in the last 15 years of the second 25 years of their history. We have just barely stepped over the first 25 years with the development of the internal combustion engine for transportation purposes and are going into the second 25. I am as positive as if I had the accomplished facts in front of me that there is a greater development ahead of us in the next 25 years in oil and automotive industries than in the past 25. Perhaps not in doubling the number of cars or the number of filling stations or the number of miles per hour. I believe that will come, that it will easily be an accomplished fact. But I believe in the extended use of power from every standpoint—that those two, oil and the internal combustion engine are going to have a most significant effect upon future industry and everything else.

What Does "Pure" Mean To Serviceability

Every once in a while the question of "pure" this or that comes up. We don't use anything pure in the automobile. Pure wrought iron is the most useless thing in the world. I don't care what you mix into your fuel. It doesn't make any difference to us, whether it's nickel or cobalt or tungsten or what not. We don't care how much you mix it. Honestly, I don't believe you would get into great trouble if somebody accidentally mixed a can of paraffin base oil with asphaltum base oil. I don't believe you would have an explosion at all.

We have got to perform certain functions and it doesn't make any difference what particular basic product you happen to use. It doesn't make any difference whether you put chromium, nickel or what not in steel. The great difficulty is keeping the advertising man from advertising the fact that you use tungsten, say today. It may not be scientifically accomplished at all, it may be only a stepping stone to what we want, if we step-by-step improve these products.

I want to discuss this thing of over-production, because all industry is complaining about over-production. The difficulty is simply this. We have been production minded for the last ten years, and it has taken ten years to get caught up with demand. We have also been economically minded, and very much interested in making money. We have gotten everything down to the "$4.87 system and that's all we can spend." All at once we began to make more than we actually needed.

That would be a terrible thing if the world was finished, but it is not at all. We don't know what we can do because we haven't tried it. Most people are entirely devoid of imagination. I can remember when, if a fellow suggested selling an automobile to a farmer, everybody laughed. I can remember when the automobile fellow would say that all the automobiles were in the city. Nobody could imagine a paved road in the country. If we had to depend on the city for all our automobiles, we would have more over-production than we have now. Now the best roads are in the country and the worst in the city. The situation of the past 20 years has turned completely over. The boulevards are in the country and not the cities any more, because the towns are all broke, and can't afford to repair the pavements and stand right politically.

You have this problem to bear with all along the line. Whenever you start in a new industry and think of advancing something, everybody thinks you are foolish at the time. In the past ten years we have been so concerned with developing and perfecting what we have, that we have not appreciated the direction in which our industry has been going, and we may have gotten on a slight angle at the present time. Nevertheless you have to accept the fact that you are going to spend a certain amount of time on development and advance, or you must do something to take up the slack created by what you have built.

We Must Create Wants For New Things

There is not enough demand for the things we could have. I was talking to a member of Parliament the other day about the dole situation. I said, "I can fix all that," and he said, "My word, what can you do?" I told him I would get some advertising man to advertise radios, phonographs, pianos, and all things you don't need, and the first thing you know somebody would buy them, then somebody would have to make them, and employ some people, and the first thing you know you would have everybody working and all these things I'm talking about. I felt like I had saved the country, you know, when the Englishman said to me, "My word, who'd employ one of those bally things anyhow?"

The thing we have done is to produce on a necessity basis. Progress is made on the want basis. People will want whatever they can get, and if we have not been foresighted enough to develop things people want, then they are just going to buy what they need. We have been just a little out of step about not recognizing that, in this over-production problem, we haven't looked a little bit ahead to see if we could not create the wants that would take up the slack after we make more than we need on today's production schedule. It is from that standpoint that I have been talking with you today. There is a wonderful co-operative spirit between the motor car industry and the oil industry, and the things that I am talking about today are not necessities, they are excellent desires that you and I have got to meet.

Phillips Department Heads Made Vice Presidents

H. A. Trower

F. E. Rice

C. R. Musgrave

CLEVELAND, April 28

THREE new vice presidents were elected by the Phillips Petroleum Co. at the annual meeting of the company at Bartlesville on April 22. They are F. E. Rice, C. R. Musgrave and H. A. Trower.

Mr. Trower is now vice president in charge of retail marketing. He has been in charge of wholesale sales for the company for a number of years and more recently has taken over the retail sales management as the company has been branching out in that direction. Mr. Trower was president of the Natural Gasoline Association of America for two years.

Mr. Rice is now vice president in charge of the natural gasoline division. He has been general superintendent of gasoline plants of the company during the long period in which it has built some 45 plants which are producing more than 800,000 gallons of natural gasoline daily.

Mr. Musgrave has been traffic manager for the company. He now becomes vice president in charge of traffic. While he has been at the head of the department the company has won a number of important railroad rate cases involving transportation charges on natural gasoline.

May Flow Water Wells With Kettleman Gas

LOS ANGELES, April 26.—Application has been made by A. F. Nunes, president of the Felix Oil Co., and Dana Hogan, Petroleum Securities Co., for a franchise to lay pipelines and erect power lines in Kings county. Bids on the two franchises will be opened May 22.

In presenting the resolution, John G. Covert, attorney for the applicants indicated the purpose of this move was to make use of natural gas from the north dome of Kettleman Hills for power purposes in irrigation wells. E. L. Doheny, head of Petroleum Securities, which drilled the Felix No. 1 on fee land, Sec. 35, north dome of Kettleman Hills, is reported interested in the enterprise.

The reference to the erection of power lines is thought to indicate that a steam plant will be erected for the generation of electric power with natural gas as a fuel. Natural gas will also be piped to water wells with the thought in mind of increasing the flow from these irrigation wells by introducing gas pressure.

If the franchises are granted, the resolution states work will commence on the projects within four months.

There is a considerable difference of opinion among engineers as to whether natural gas could be economically used to repressure water wells and a determination of this point is thought to be necessary before any definite action can be taken by the court. The applicants are reported to be convinced of the economy of using natural gas in this manner.

Humble Abandons Six Day Week

By Telegraph

HOUSTON, April 28.—In announcing April 28 that is was abandoning the recently announced policy of operating on an equivalent six-day week in the petroleum industry, President W. S. Farish of the Humble Oil & Refining Co., said:

"On March 4 of this year, the Federal Oil Conservation Board suggested to the petroleum refining industry that it adopt a Sunday shutdown plan as a means of preventing the further accumulation of stocks of gasoline, and of bringing supplies more nearly in line with consumption demand. A number of refining units adopted the suggestion of the Federal Oil Conservation Board, and the gasoline situation has to this extent been improved.

"While the operations of the Humble Oil & Refining Co., have been in balance for many months past, this company in adopting the suggestion of the Federal Oil Conservation Board, went further and extended the Sunday shutdown to drilling, producing and transportation operations. This extension of the suggestion to operations other than refining has not been generally adopted by others in the industry and the Humble Oil & Refining Co., now finds it necessary to modify its present curtailment in order to bring its supplies more nearly in line with consumption demand. It is the purpose of the Humble Oil & Refining Co., not to let its stocks of gasoline exceed stocks on hand the same date a year ago."

Indiana Jobbers Told Code Has Slowed Wasteful Equipment Distribution

By Roger B. Stafford
N. P. N. STAFF WRITER

INDIANAPOLIS, April 25

ONE of the biggest benefits expected under the code of ethics has come this spring in the curtailment of turnover of dealer accounts and of the promiscuous installation of gasoline dispensing equipment at lunch stands and similar unprofitable outlets, Paul E. Hadlick told the Indiana Petroleum Association at its spring convention here yesterday.

Mr. Hadlick is secretary of the new marketing division of the American Petroleum Institute.

The code, gasoline inspection fees, gasoline taxes, chain stores, and a proposed constitutional convention for Indiana, were discussed before the convention at which 72 men were registered.

"If the code does no more for the jobber, distributors or refiner, than to stop the turnover in dealer accounts, with the attendant ever-mounting expense, it will have been worth all it has cost," Mr. Hadlick said.

Mr. Hadlick laid aside a prepared address to discuss the problems under the code encountered by the individual distributors.

"The code has been preached from coast to coast," he explained, "so what we need now is a closer following of the preachings."

Distributors may expect to get out of the code benefits in proportion to the contributions they make to the code to secure its widest possible observation, he said.

"Do not build your hopes too high for the code," he concluded, "nor scoff at a worthy attempt to bring sane marketing out of chaos. A fair trial will tell. Give the code that trial."

Chief discussion of the code centered about a question put by V. C. Van Hook, Premier Refining Co., Princeton, Ind. Mr. Van Hook asked whether it was ethical for one supplier to try to get a dealer outlet from another supplier in a case in which the second supplier had a contract with the dealer, the first supplier seeking to acquire the account at the expiration of the contract.

Mr. Van Hook contended that it was unethical but Mr. Hadlick took the opposite view, saying it would be unethical only if the first supplier mentioned induced the dealer to break his contract with the second supplier mentioned.

Emphasis was again laid on the fact that the code was not a price establishing or price maintaining instrument but only a set of rules for the conduct of the marketing branch of our industry.

Oil inspection in Indiana in 1929 cost $83,348.81 but the state collected $369,422.51 as inspection fees, turning the balance of $286,073.70 into the state general fund. Inspectors are paid $80 to $125 a month and most of the gasoline and kerosene is sold without prior inspection, although the state collects a fee of 4 cents a barrel.

Claude H. Anderson, Indianapolis, attorney for the Indiana association, said he believed the Indiana Supreme court would annul inspection if the law were attacked but it would be only a short time before the state would get another inspection law. He said he believed it would be better for the association to have prepared a new inspection law that would be fair to the oil companies and to the public but which would provide for a fee to cover only the cost of adequate inspection.

BLANK protest forms were distributed for signing by oil companies of Indiana. The present inspection law was described in the form as inefficient and a public hazard.

A. N. Bobbitt, Indiana auditor of state, and president of the North American Gasoline Conference, reviewed the gasoline tax statistics of 1929 and then told how his department keeps tab on gasoline shipped into, or originating in the state, for distribution in Indiana and the taxes paid.

A card index is made of all gasoline shipments reported by railroads. When distributors' reports are received these are checked against the railroads' reports. If a distributor makes false reports his permit to do business in Indiana may be revoked.

The permit of the Dunes Oil Co., of Michigan City and South Bend, was revoked the day before Mr. Bobbitt addressed the convention. This company is a bulk storage service station operator and tax records show that it has been paying taxes on an average of one carload of gasoline a month. In 1929 it paid taxes on 91,734 gallons; in January, 1930, on 6137 gallons, and in February on 5665 gallons. Report on March gallonage is not yet due, but it is alleged that the company received in March 11 carloads of motor fuel billed to it as distillate. Tests of one car of this distillate, it is alleged, showed it to be 55 degrees A.P.I. gravity, 90 degrees F. initial boiling point, 50 per cent over at 288 degrees, 424 end point, and 95 per cent recovery.

Oil men at the convention pointed out that the distillate was undoubtedly gasoline and subject to tax but that the billing of the cars as distillate was a violation of interstate commerce regulations. It is probable, they said, that a complaint would be filed with the Interstate Commerce Commission against the shipper.

The taxes, it is said, were paid by the company on natural gasoline which was blended with the heavier product.

Mr. Bobbitt told the convention that bootlegging of gasoline across the state lines and refunds were the two big problems of the collection. Oil men said the bootlegging was being done mostly in the Chicago industrial area and at Terre Haute.

Refunds are paid by the state to farmers and others who use exempt gasoline only when the supplying company has been paid the cost of the gasoline. The farmer must have a receipted bill, or the state will file the invoice the farmer has presented only as a request for a refund and he must pay the bill before the state will pay him. The state's contention is that the farmer cannot be reimbursed for something he has not paid.

ALBERT H. Gisler, secretary of an Indianapolis wholesale grocery, urged the oil men to patronize their local Independent merchants and not the chain stores which he asserted were threatening the middle classes by dividing American society into two classes—a monopolistic capital-supplying class and a salaried or wage earning class.

He asserted chain stores were limiting economic opportunity for the individual. He declared they had caused the closing of many rural banks because they had ruined the businesses of local merchants who consequently had little or no money to deposit and did not need to borrow for business. Chain stores, he said, banked with the larger city banks.

Opposition to the proposed constitutional convention for Indiana on the grounds that it would put business in a state of unrest for at least two years, was voiced by H. H. Evans, a

state representative, and Phillip E. Zoerscher, a member of the state tax commission.

Herbert Davis, Service Oil & Gas Co., Sullivan, president of the association, said the association would hold a short meeting in mid-summer and a meeting of two or three days in the fall.

Associate members of the association have joined with Max L. Wickersham, executive secretary, to draft plans for the fall meeting at which an attendance of several hundred is sought. All distributors in the state will be solicited to attend and a varied program of helpful addresses is already being formed.

Purchase Price for Gasoline Posted in California

NEW YORK, April 21

THE Standard Oil Co. of California April 23 announced through its New York office, as well as its California headquarters, that it would buy U. S. Motor gasoline at 6.50 cents per gallon, f.a.s., San Pedro. San Pedro is the harbor for Los Angeles and the port from which gasoline made by refiners in the Los Angeles district is shipped out by water.

The price announced is for delivery within 30 days, and is subject to market conditions. In its statement the company said that, upon application, it would quote prices for the purchase of higher grades of gasoline.

Posting a price for the purchase of gasoline is an innovation in the oil industry. Previously prices were posted at which the Standard would buy crude oil but, never in California nor elsewhere, has a price been posted for refined oils.

It is believed the practice will tend to maintain a more stable market in California by taking surplus or distress offerings off the market and to keep prices steady. In the past few weeks California refiners have sold U. S. Motor to buyers on the Atlantic Seaboard, at prices which scaled downward to 5.50 cents per gallon and there were unconfirmed reports of sales being made below that price. At this time California refiners were quoting from 5.75 to 6.25 cents per gallon.

Also cargoes have been started around to the east coast, before a buyer was found for them and, when sold, the California seller realized a very small netback.

East coast refiners believe the California company's precedent will have a stabilizing effect on Atlantic Seaboard markets. It will have little effect on the goods shipped into this market under contract but it will tend to keep down the amount which in the past literally has been dumped into eastern markets because there were no purchasers on the west coast.

In making the announcement the Standard company issued the following statement:

"The Standard Oil Co. of California announces the establishment of a posted price at which it offers to purchase gasoline in cargo lots delivered to the ship's rail at San Pedro, California. Posting a price for the purchase of gasoline is a new policy and an innovation in the oil industry. For many years the Standard Oil Co. has posted the prices it offers for crude oil at the wells and in the oil fields, but the wholesale gasoline market has never, in California nor elsewhere, had the benefit of a published purchase price.

In the past distress gasoline has from time to time been sold at prices actually below the cost replacement. It is believed that the existence of such a price will be of considerable importance in establishing essential values and in maintaining an orderly market condition."

Although the California Standard has made no statement regarding the disposal of gasoline it might buy under this new plan, it is believed it will be used to supply the company's export business.

No other major company in California has made any announcement regarding the publishing of a purchase price for gasoline.

Little Change In Crude Stocks

NEW YORK, April 28.—Very little change occurred in pipe line and tank form gross domestic crude oil stocks east of the Rockies during March. They increased but 16,000 barrels over February, as compared with an increase of 1,019,000 barrels in February over January, according to the preliminary figures of the American Petroleum Institute.

Gasoline Prices Increased On Pacific Coast

LOS ANGELES, April 25.—Major oil companies on the Pacific Coast increased the actual tank wagon delivery price of gasoline April 22 at all points in the territory except Phoenix, Ariz.

At the same time resellers handling major company products boosted retail prices to levels held prior to the initiation of the so-called gasoline war. Independent refiners were slightly less prompt in following the price increase.

Price cutting activities among some service stations handling these Independent gasolines in southern California continued to hold the retail price in the particular districts below the uniform price of 19.5 cents at service stations reselling major company products.

Readjustment of the retail gasoline prices on the Pacific Coast, which included principal distributing centers of California, Oregon and Washington, was considered a step forward in stabilization of the resellers' market. It is conceded that some Independent gasolines will continue to be sold at from 2 to 3 cents under the posted rail price.

Overproduction of crude, a considerable portion of which was due to townlot drilling by Independent operators in the Los Angeles basin, as usual was given as the basic cause for the recent gasoline price cutting. Increased crude stocks, caused to a large degree by inactivity in the export gasoline market, combined with the necessity of even the larger Independents to maintain their daily runs of crude bought under contract and the need for ready cash prompted the present disturbance.

Although this surplus gasoline sold, in many instances, at "bootleg" prices, it was practically all straight run motor fuel of city-test quality and found a steady sale among even the most particular motorists.

Major oil companies in California, with the exception of The Texas Co., have established a posted wholesale tank wagon price of 21.50 cents in the Los Angeles basin, including 3 cent state tax, giving a 6 cent differential to the reseller. The Texas Co. maintains a 19.5 cent total tank wagon price and delivers at the same price as the others, or at 15.5 cents. This new system of handling the reseller market is due to the fact that, with the exception of The Texas Co., major companies on the Pacific Coast operate on both a 4 and 6 cent margin to the station operator under the posted tank wagon price. By making an additional 2 cent discount to those resellers having the 4-cent contracts, all dealers were treated impartially.

Who's to Build New Crude Line Still a Mystery

By L. E. Smith
N. P. N. STAFF WRITER

By Telegraph

TULSA, April 29.—The Ajax Pipe Line Co. has been incorporated in Delaware with officers and directors from among executives of Ford, Bacon & Davis. This firm asserts that the project has been sponsored by it independent of any oil company and will be built if a market can be found for the oil.

Six surveying parties now are at work under direction from offices recently opened at Springfield, Mo., in the Wilhoit building. Most of the preliminary work in Oklahoma is complete.

It now appears that the western terminus of the line will be Glenn Pool and not Cushing. It may or may not be significant that the Oklahoma Pipe Line Co. (Standard of New Jersey subsidiary) is so situated that a tie-up could be made there.

TULSA, April 26

NOTHING—not even an advance in the price of oil—has stirred up more comment in Tulsa recently than the "mystery" pipe line.

Professional and volunteer investigators have been running in circles on it, usually meeting themselves coming back, in the attempt to ferret out the ownership. Thus far about all that has been discovered is the names of companies that are NOT building the line.

The data as of the present can best be grouped under two headings:

Alleged Facts: The line is to be 10-inch, for the transportation of crude oil, running from the "Cushing district" to somewhere in the vicinity of St. Louis. It is given the working title, as they say in the movie industry, of Ajax Pipe Line Co.

Facts: Machinery has been bought by the engineering firm of Ford, Bacon & Davis, for seven pump stations of three units each and tentative orders placed for two more stations. The type of pumps seems to preclude the possibility of its being a gasoline line. Ford, Bacon & Davis are managing the construction and handling the purchases, asking for bids, etc.

That about sums up everything that is known about the project. As soon as the news filtered out that something big was going on, everybody of voting age started in to ask questions. Doubtless the true inwardness of the affair will be revealed in good time, but there are many curious people in this industry who like to know, yesterday if possible, what is happening today.

Cleveland, April 28.—W. C. Teagle, president of the Standard Oil Co. of New Jersey, refused to make any statement regarding the 10-inch crude oil pipe line from Oklahoma to the St. Louis district which is reported to be planned by the Ajax Pipe Line Co., when he was asked whether the line was a project of the New Jersey company.

E. J. Bullock, vice president of the Standard Oil Co. of Indiana, denied that his company had any connection with the proposed line. He stated that the Wood River refinery is well supplied with oil.

O. D. Donnell, president of the Ohio Oil Co., told this publication that he had no information regarding the Ajax Pipe Line Co. or who might be planning a pipe line to St. Louis. The Illinois Pipe Line Co., sister company to the Ohio, has a trunk pipe line with a western terminus at Wood River where it connects with the Prairie pipeline system.

At this moment the finger of suspicion is pointed at the Standard Oil Co. of New Jersey. Such conclusion seems to be based upon the slender clue of the past relationship between the Jersey company and Ford, Bacon & Davis. This engineering firm has handled some big construction projects for the Jersey in the past, principally in gas pipe line building.

Earlier guesses as to the identity of the company putting in the line included nearly everybody now in the pipe line business. The Ohio Oil Co., Shell Petroleum Corp., Tide Water, Standard Oil Co. of Indiana, Vacuum Oil Co., Cities Service and several others were mentioned. Through inquiry it has been fairly definitely established that it is none of these. The Prairie is out of the discussion, as it completed its building program last year and is well equipped to take care of its trade. The Sinclair Pipe Line Co. is in the same position.

Ford, Bacon & Davis know how to keep secrets entrusted to them. Some of the equipment people who were asked to submit quotations on machinery were told quite firmly that questions concerning the interested company were beside the point, that quotations should be made f.o.b. factory and the destination of shipments would be revealed in good time.

From equipment men comes the report that 15 McIntosh-Seymour engines, six Worthington engines, 15 Prescott pumps and six Worthington-Dean pumps have been purchased and that three more engines and three more pumps have tentatively been ordered. Pipe men in this territory believe that the orders for pipe have not been placed.

This is all very interesting but not precisely informative. If it is the Standard of New Jersey that is building a pipe line, striking across country in a direction new for them—their Oklahoma Pipe Line goes southeast to Arkansas—it might mean one of several things. It might, for instance, mean a New Jersey refinery in Indiana territory. Fences are being jumped in all directions nowadays and it would be no more remarkable sight to see the Jersey company in Indiana territory than to see the Standard of New York in that same district, where it now is through the recently acquired White Eagle company. Then it might mean shipment of crude oil to St. Louis territory for transshipment through the Illinois Pipe Line east to the New Jersey refinery at Parkersburg, W. Va., and to any others the company might acquire or build.

Back of this pipe line program, which doubtless must be taken as authentic inasmuch as Ford, Bacon & Davis never play April Fool jokes, there is big news to the oil industry. It is of no use to say what the news is so long as remains unknown the identity of the people doing the work. The game that is going on today is being played with blue chips and almost any kind of reshaping of industrial policy is possible.

Late Market Changes

PITTSBURGH, Pa.—On April 29 the Pure Oil Co. advanced the price of Midland district crude in Michigan 10 cents, making new price $1.35 per barrel at the well.

* * *

NEW YORK—On April 29 Standard Oil Co. of New York advanced tank wagon and service station prices of gasoline 1 cent throughout New York state and New England. This is the second advance for the month and for the year, the last previous change having been a 1 cent advance on April 9.

* * *

PHILADELPHIA—On April 30 Atlantic Refining Co. will advance tank wagon and service station prices of gasoline 1 cent in Massachusetts, Connecticut and Rhode Island, meeting the Standard of New York.

Review of Late Production News

PRODUCTION of crude in the U. S. was at the rate of 2.590,100 barrels daily in the week ended April 26, according to the American Petroleum Institute. This is a gain of 29,200 barrels over the previous week.

Oklahoma output gained but 3950 barrels and California 2900 barrels.

In Texas fields, outside of the Gulf Coast area, there was a gain of 18,000 barrels. Kansas gained 8850 barrels, due to Voshell pool which gained 6900 barrels.

The largest change in the Texas fields was in Young county which rose 7350 barrels. Ector gained 1700; Yates 2600; Gray county 2200; Van Zandt 1600 and Darst Creek 2000 barrels. Barber's Hill declined 4100 barrels.

Oklahoma City gained 5050 barrels; Sasakwa 3100 barrels and Earlsboro fields 3050 barrels. Little River declined 5200 barrels.

Crude oil imports rose 35,000 barrels, to 200,285 barrels daily average. This brought total new crude supply to 2,790,-385 barrels, a gain of 64,200 barrels over the previous week.

California

DAILY average production of crude oil on the Pacific Coast for week ended April 26 was estimated at 629,600 barrels, an increase of 4700 barrels over the previous week. This increase was accounted for by completions at Kettleman Hills and at Elwood for approximately 6000 barrels.

Paul Boggs, chairman of the State-Wide General Committee on Oil Curtailment has appointed a committee of 11 experts for the purpose of determining the fundamental condition of the oil industry and the amount of additional voluntary curtailment required to reduce the state's oil production to the desired figure of 575,000 barrels. Although there was some talk of attempting to reduce the daily crude output to 550,000 barrels, experts are of the opinion that any such figure would be too drastic at present.

Court delays continued to hold up further constructive moves in California's gas law case and although the Santa Fe Springs hearing is scheduled to be continued May 1, the fact that further action of the alternative "Writ of Prohibition" has been set forward until May 6, is expected to prevent a necessary modification of the existing temporary injunction.

Developments in the San Joaquin Valley and Los Angeles Basin fields combined to hold the spot light during the past week, as various wildcats and projects in proven areas reported favorable showings from unexploited horizons.

Current production in this country by pools is found on page 113.

Texas, New Mexico, Louisiana

A SECOND test in the Shafter Lake region of Andrews county, West Texas, has found gas at the 2900-foot level. It is the Deep Rock Oil Co's. No. 1 Hayden Miles, in sec. 22, block A-46, one and a quarter miles south of the same company's No. 1 Ogden oil discovery. The Ogden is making approximately 120 barrels of oil daily in lime pay below 4000 feet and is the only producing well in the county.

The Shafter Lake area of Texas lies in a northwest-southeast trend of the Permian salt basin province and is situated southeast of the Hobbs district of Lea county, New Mexico. It will be served by the Atlantic Pipe Line Co.'s. system connecting the Hobbs area with its Midland tank farm. The Atlantic's line to Hobbs is due for completion June 1 and Humble Pipe Line Co's. Hobbs extension May 15.

Three new locations have been made in the Young County, central north Texas, area of Nash & Windfohrs' No. 1 McCloud, J. W. Manning survey 36, which is still flowing upwards of 400 barrels of oil and 200 barrels of water hourly.

Oklahoma-Kansas

THE Spring drive seems to be on in the Mid-Continent as wildcats in three states have prompted the drilling of numerous offsets. The Konawa pool of Seminole county, Okla, had two new ones come in on the edges that make a total production larger than that of the whole pool. South Earlsboro, in Seminole county, got its largest oiler on its south end and the West Chandler area found new rigs all around the new wells of last week.

Oklahoma City stretched its pool to the north where three 14,000 barrel wells blew in and first reports on new operations started coming in at once. Most of the latter are in the town lot area and a few are actually within the city limits. City ordinances are just about ready to regulate the traffic and their tricky clauses are liable to make legal difficulties for the operator that does not watch his step.

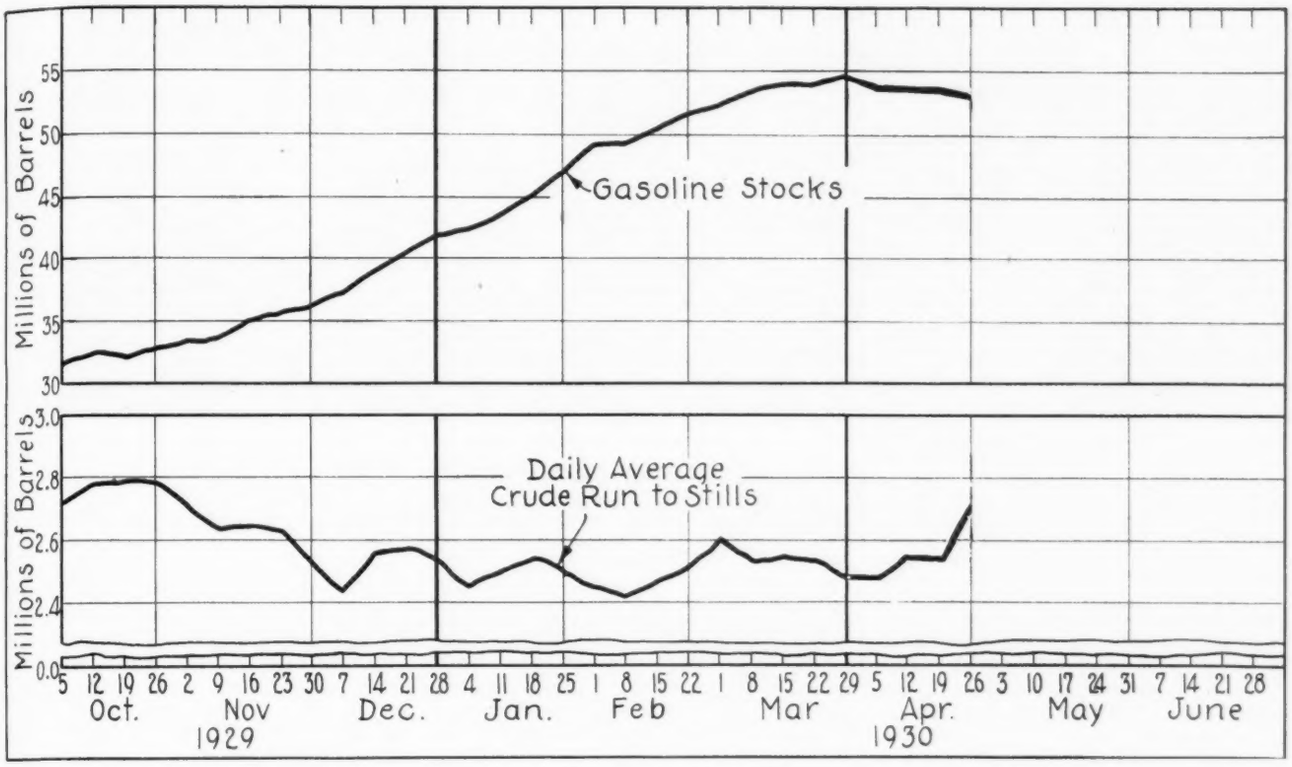
The Panhandle of Texas showed increased activity with 39 new locations staked out during the past week. Many of these were in Hutchinson county in what is known as the Pantex area. Up in Moore county a new pool is forming around the Operators discovery.

Wyoming, Montana

THE northern area of the Rocky Mountain states is particularly active this season. The Spring Coulee structure, in southern Alberta, is to have a thorough test by the Canadian Exploration Co., a subsidiary of the Humphreys corporation of Denver. One well has been spudded in. In the Red Coulee field, which lies on the international line between Alberta and Montana, there are some 20 or 25 operators either already at work, or preparing to move in.

In Wyoming the Osage field is still very interesting. A half-dozen independent operators are drilling in the new extension. Ohio Oil Co. was dealing with some acreage holders for leases in the field, but it is understood that the price asked was beyond what the company considered a reasonable figure, and negotiations have been dropped.

U. S. Crude Runs and Gasoline Stocks as Reported Weekly by A. P. I.



U. S. Crude Runs Increased 147,300 Barrels

By Telegraph

NEW YORK, April 29

INCREASED demand for gasoline pushed the lid off of refinery operations during the week ended April 26. Refiners increased their crude charges to stills 147,300 barrels daily average according to reports gathered by the American Petroleum Institute from plants comprising 95.6 per cent of the total capacity of the country.

Daily average crude runs for the week were 2,699,600 barrels, which utilized 76.7 per cent of the rated capacity of reporting plants. In the previous week runs averaged 2,552,300 barrels per day when refiners were running at 72.6 per cent of capacity.

The largest increase in runs was made by east coast refiners, 64,600 barrels daily average. Texas refiners, chiefly those on the Gulf Coast, increased runs 40,100 barrels daily average and California refinery throughput was stepped up 34,300 barrels daily average. Every group except Oklahoma and Kansas showed an increase. Refiners in those states cut their runs 7900 barrels daily average.

A huge increase in gasoline demand in the country as a whole is indicated by the figures, although the Institute report does not show production or shipments. Stocks of gasoline at all plants were reduced 265,000 barrels during the week in spite of the huge increase in crude run to stills.

Minor reductions in gasoline stocks were reported by all groups except the Appalachian and California areas. Here the increases were small.

Current Refinery Operations

Districts	Per Cent Capacity Reporting	Daily Average Crude to Stills (Barrels) Week Ended		Per Cent of Reporting Capacity Operated Week Ended		Stocks (Thousands of Barrels)			
		Apr. 26	Apr. 19	Apr. 26	Apr. 19	Gasoline Apr. 26	Gasoline Apr. 19	Gas & Fuel Oil Apr. 26	Gas & Fuel Oil Apr. 19
East Coast	100.0	517,500	452,900	85.4	74.8	9,243	9,284	6,466	6,632
Appalachian	91.0	91,700	87,800	78.6	75.3	1,893	1,885	773	775
Ind.-Ill.-Ky	99.5	333,000	330,000	88.6	87.8	8,719	8,769	3,492	3,338
Okla.-Kans.-Mo	89.1	319,900	327,800	77.7	79.6	4,366	4,401	4,123	3,731
Texas	90.8	604,200	564,100	84.4	79.2	7,694	7,819	10,010	10,279
La.-Ark	96.8	176,100	168,200	67.2	64.2	2,620	2,726	2,120	2,052
Rocky Mountain	93.6	60,700	59,300	43.6	42.6	2,814	2,863	1,077	1,051
California	99.3	596,500	562,200	66.9	63.1	15,863	15,730	108,624	108,179
Total	95.6	2,699,600	2,552,300	76.7	72.6	53,212	53,477	136,685	136,037
Texas (Gulf Coast)	100.0	456,600	422,500	86.7	80.7	6,640	6,792	7,282	7,675
La. (Gulf Coast)	100.0	108,600	104,400	73.6	70.8	2,253	2,361	1,220	1,184

Simms Operating Group Tours Fields

DALLAS, April 17

ITS annual staff meeting last week of key men in the producing areas of Texas was taken to the oil fields by the Simms Oil Co., one of the larger Independent operating units of the southwest.

Gathering his organization together at Dallas headquarters, W. L. Todd, production vice president, skippered a crew of 20-odd through all North and West Texas fields where the company is operating, visiting other interesting territories on the way.

After making the trip, Mr. Todd expressed satisfaction with his idea of having the organization discuss field problems on the ground, where the field superintendent could explain his troubles concretely and get the benefit of the experience of others.

It is the Simms policy to standardize equipment, wherever possible, on wells, pipelines, natural gasoline plants and lease buildings. A discussion on this subject was held at one stage of the trip with the idea of furthering the work. Under standard practice, material no longer needed on a given lease may be shipped to another property and duplication of purchases avoided.

A full week was spent in the field by the party of officials, superintendents, agents and other employes. Stops were made in the Greater Wichita Falls district and the northern part of the General Ranger territory. Then the group moved into the Abilene district on its way to Midland, for the southwestern district meeting of the American Petroleum Institute division of production.

After visiting West Texas the party returned to Dallas through San Angelo and the Coleman shallow sand territory that fringes the General Ranger black lime region on the southwest.

An accompanying picture taken at Midland shows from left to right in the front row: W. L. Todd, vice president; C. A. Cunningham; C. G. Fisher; Blaine Johnson; F. F. Herzog; R. R. Forester; I. M. Avent; R. W. Taylor. Back row: R. B. McGuire; J. L. Wright; I. E. Hood; Frank Gardner; W. H. Harrison, Jr.; L. P. Blanton; Jay Sandloe; J. L. Farley; J. A. Pearl; W. G. Gearn; J. B. Holloway; H. W. Scott; E. H. Lee; and C. F. Brooks.

On the trip but not shown in the picture were D. H. Voss, treasurer, and Robert Lindsay and C. H. Campbell of the Dallas office.

Extend Oklahoma City Field Half Mile

By Telegraph

TULSA, April 29.—The Oklahoma City pool was extended one half mile west by the Hall Briscoe No. 1 Lindsey, NE SE NW 14-11-3W, when it came in for 500 barrels an hour April 28. The sand was topped at 6389 and the well was bailed in at a total depth of 6461, making 484 barrels the first 50 minutes.

In Rice county, Kansas, the No. 1 merger of Allison and Fitzwilliams SW SE NE 21-20-10W extended the Raymond pool one quarter of a mile east. The siliceous lime pay was from 3368 to 3373 and the well though as yet untested looks to be as good as those in the pool. It is estimated to be a 500-barrel producer.

Pioneer Lubricating Engineer Dies

CLEVELAND, April 29.—Frank Harris Floyd, operating a lubricating oil business in Detroit under his own name, and one of the pioneer lubricating engineers of the country, died recently in Los Angeles. Interment took place in Boston.

Mr. Floyd started in business about 25 years ago in Detroit. It is said that it was largely through his efforts that the automobile companies there began buying lubricating oils on specifications. He has not been active in the company for the past five years, the business being carried on by his son Robert Floyd. The company has an extensive storage and compounding plant at 747 Beaubien St., Detroit.

To Compress Okla. City Gas for Producers

CLEVELAND, April 28.—Phillips Petroleum Co. announced today the formation, in conjunction with Oklahoma Natural Gas Corp. interests, of the Philokla Gas Co. The new company will compress natural gas from the Oklahoma City field after the gas has passed through the Phillips plants for the extraction of gasoline. The proposed plant will have a capacity of twenty-five million cubic feet daily.

Phillips has large prospective gas reserves in the Oklahoma City field in addition to having entered into gas purchase contracts with many producers and is erecting two natural gasoline plants in that field with a total capacity of 100,000,000 cubic feet daily, subject to further expansion, according to company officials.

After the gasoline has been extracted the gas will go to the compressors and then will be marketed by the Oklahoma Natural going either into the gas company's retail distribution transmission lines or to the producers in the field to be used for lifting oil, when the field pressure is reduced to a point where the wells no longer will flow naturally. This plan, according to its sponsors, will obviate the necessity for the construction by individual operators of repressuring plants with which to lift their own oil.

Trouble Causes in Gas Engine Operation Described to Gasoline Plant Men

By John Power
N. P. N. STAFF WRITER

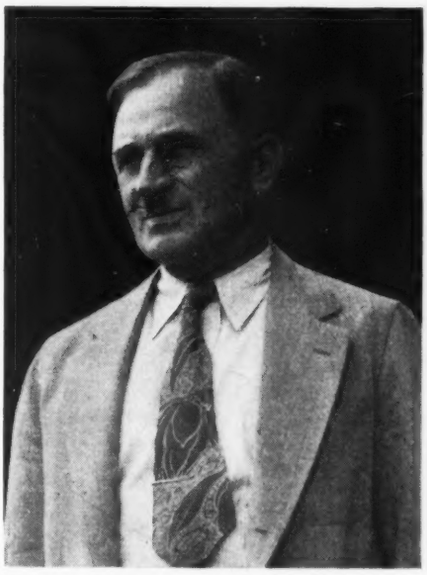
BRECKENRIDGE, April 23

TO DISCUSS their mutual problems, and to hear papers prepared by experts in special lines, some 137 gasoline plant operators met at Breckenridge April 22.

The program had been planned under the direction of Dr. E. R. Lederer of the Texas Pacific Coal & Oil Co., to emphasize the various methods which combine to make up good practice in plant operation, rather than to describe and explain anything new in methods or equipment.

Some discussion was evoked after the reading of the paper on Boiler Operation and Maintenance, by L. D. Scarborough, of the Hartford Steam Boiler and Inspection Co. Several of the men asked questions pertaining to the safety features of boiler operation. Such points as having the steam outlet lines away from and back into the boiler, the use of gate, or check valves rather than the globe type on water lines, to prevent the scaling up of the former type by bad water, the maintaining of an even water level at all times, through the use of sufficient water feed pumps. In the latter case, Mr. Scarborough favored the use of several small units, rather than one large unit.

In his paper on the Care and Operation of Gasoline Plant Machinery, D. B. Hiatt, superintendent of plants for the Texas Pacific Coal & Oil Co. said that "in the care and operation of machinery the plan personnel is as much a factor as the kind, type or age of the equipment. Like the boll weevil lubricator, there is no place in this work for the soldier who does only as he is told, for the nervous soul who gets excited and jumps at conclusions, for the robot who goes about his tasks by mechanical, set rules, for the hard head who will not change his mind in the face of proven facts, or anyone who will not apply ordinary common sense and physical laws to his everyday problems. When these have been eliminated, you will find a lowered operating expense and a higher efficiency rating.



Otto Peters, of Brooks-Hanlon, Inc., whose paper on handling and shipping natural gasoline was heard with considerable interest

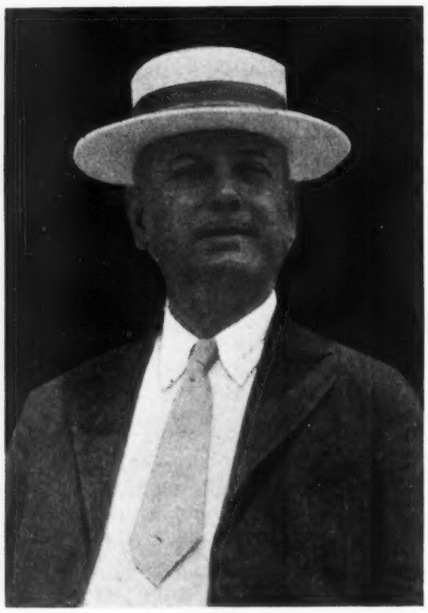
"Most of the trouble encountered with gas engines," said Mr. Hiatt, "comes from improper lubrication, jacket scale, overloading, ignition systems, bad alignment of bearings, lack of necessary repairs, and changes in gas supply.

"For lubricating problems it is usually best to have the recommendations of the lubricating engineer of the company from whom you are buying your oils. We have found that from 20 per cent to 50 per cent of the oil commonly used in the cylinders can be saved with less trouble caused by stuck rings, fouled spark plugs, and carbon if the proper oil is used, and the rate of feed it cut down accordingly. As a general rule, the lightest oil that will lubricate under any set condition is the best to use.

"The gas supply," he said, "should be well regulated, and should be clean and free from moisture. Much trouble is caused by worn regulator valves and loose governor connections causing irregular, or choked gas feed. Sudden changes in the B.t.u. content of the gas will make trouble in the engine room. Unless the feed can be kept regular, it is not best to use

Don Wallace and H. N. Blakeslee, of the National Safety Council, urged the plant operators to pay particular attention to the safe working of their subordinates

E. R. Lederer, chairman of the meeting and D. B. Hiatt, who read a paper on the care and operation of gasoline plant machinery. Both of these gentlemen are with the Texas Pacific Coal & Oil Co.



L. D. Scarborough, Hartford Steam Boiler Inspection and Insurance Co., told the plant operators that the most valuable service rendered by boiler insurance companies generally was the inspection of the steam generating equipment by a careful, impartial agency specializing in such matters

uncondensed vapors in the engine room fuel on this account.

"Jacket water cooling requirements vary with different inlet temperatures from five to 25 gallons per horsepower hour. The outlet temperatures should not exceed 140 F., but you may have a low outlet temperature, and a hot engine if the jackets are scaled." The types of water feed, whether treated or untreated water, open or enclosed water cooling system were matters of individual preference, Mr. Hiatt said, so long as there was a constant water supply, and the jackets were kept free from scale.

In connection with matters of inspection and repairs Mr. Hiatt said that at least once a month "each unit should be shut down for complete inspection and cleaning, paying particular attention to the need for small repairs. All bolts on moving parts should be replaced after two or three years' service," he said. Whenever it is necessary to make repairs to engines which have been badly worn it has been found more economical to completely overhaul the engine, replace or rebush all working parts, realign the bearings, and in some cases reset the engine completely if it is loose on the foundation.

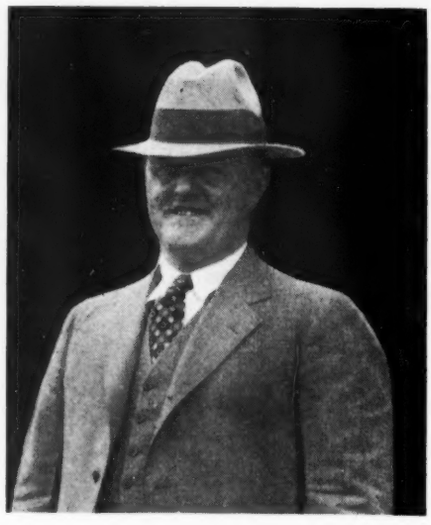
"The ignition system," Mr. Hiatt continued, "is the main cause of everyday trouble, unless it is properly cared for. The failure of magnetos to fire is caused largely by the accumulation of oil and grit which shorts out the circuit. To prevent shorting wiring should be kept supported away from the engine.

"As a rule, pumping equipment, especially steam pumps receive more abuse than any other machinery in the plant. I would not recommend the use of steam pumps for any constant service with more than 50 to 75-foot piston speed.

Robinson Revises Book On Fractionation

CLEVELAND, April 28.—The second edition of "The Elements of Fractional Distillation" by C. S. Robinson has just been offered to the public by the McGraw-Hill Book Co. of New York. This work, first published in 1922, is well known to technical men of the petroleum industry, and fills a very denite place in the refinery library.

In addition to the material included in the first edition, a large amount of new material has been added to bring the work up-to-date. Recognizing the importance of proper understanding and application of the principles of fractionation to the manifold problems of petroleum refining, the author states in his preface to the second edition:



E. H. Triphaus, Taylor Instrument Co., explained regulators and controlling devices in the paper he read to the plant operators

"I have taken the opportunity to include a certain amount of material directly applicable to that industry. This includes the recent work of W. K. Lewis and his associates on the vaporization and rectification of complex hydrocarbon mixtures, natural gasoline, and petroleum, McAdams' study of the weathering of natural gasoline, Carey's and Smoley's studies of the efficiencies of rectifying columns—all of which it is believed will be of the greatest assistance to the designers of distilling equipment."

The last four chapters, treat entirely the subjects of distillation and rectification of petroleum and natural gasoline and the design of apparatus for this purpose. Rectification of complex hydrocarbon mixtures, of natural gasoline, analysis of the data on weathering of natural gasoline, and the design of topping units with single and multiple columns are some of the subjects treated in these chapters. The method of Lewis and Wilde for the determination of the number of plates in a rectifying column is outlined, with tables and curves to be used in the application of this method.

The appendix includes data and curves on vapor pressures, boiling point relations of binary mixtures, steam distillation, heats of vaporization and curves showing the density, boiling points, and vapor pressures of petroleum hydrocarbons. Price of the volume, $3.00.

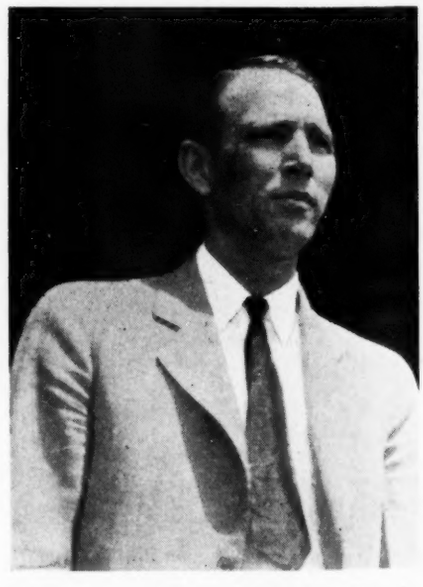
President of Swan-Finch Oil Dies in California

NEW YORK, April 28.—William G. Moncrieff, president of the Swan-Finch Oil Corp. here, died suddenly at the Hotel St. Francis in San Francisco on April 21. He had been on a short vacation.

Mr. Moncrieff was born in London, Ont. about 65 years ago. He moved to the United States in 1888 and 11 years later organized the Cataract Refining & Mfg. Co., at Buffalo, serving as its president. When that company merged with the Swan-Finch company in 1919, Mr. Moncrieff became president of that company. The company operates a lubricating oil refinery at Warren, Pa.

Mr. Moncrieff was a member of the Union League Club of New York, The Buffalo and Country Clubs of Buffalo, the American Club of London, Ont., and the National Club of Toronto.

Funeral services were at St. Basil's Church, Toronto, Ont., April 26.



E. E. Stovall, Lone Star Gas Co., described meters and their operation

Refiners' Gasoline Blending Problems To be Discussed at Convention

TULSA, April 26

THE program for the ninth annual convention of the Natural Gasoline Association of America has been announced. The convention will be held May 20, 21, 22 at the Mayo Hotel, Tulsa.

The first day's program will be under the chairmanship of Frank L. Chase, Lone Star Gas Co., who will make the welcoming address. Dr. E. R. Lederer, Texas Pacific Coal & Oil Co., and president of the association, will then address the convention. The rest of the first morning's session will be devoted to the appointment of the nominating committee, charged with the nomination of men for the various offices of the association during the coming year.

Luncheon all three days of the convention will be of the Dutch persuasion, furnished by the Natural Gasoline Supply Men's Association.

The first event on the afternoon program is the paper by G. M. Davidson, Empire Oil & Refining Co. on "Specifications." The paper is to be in the nature of a report of the activities of the technical sub-committee on specifications.

The sub-committee, headed by Mr. Davidson, and in addition, consisting of R. C. Alden, Phillips Petroleum Co., R. E. Baker, Shell Petroleum Corp., J. L. Gallagher, Sinclair Oil & Gas Co., J. M. Vaiden, Skelly Oil Co. appointed by both the technical and specifications committees, has been in charge of all research work which has been done by the association during the past year working toward the promulgation of new specifications.

A last minute change in plans has left a space on the program the first afternoon which has not as yet been definitely filled. It may, in all likelihood, be taken up by the discussion of the foregoing paper by Mr. Davidson.

The second day of the program has been termed "Refiners' Day." The program for this day has been especially arranged to be of interest to refiners and blenders. W. A. Melton, Deep Rock Oil Corp. is the chairman of the day.

The first paper read will be on the "Blending Value of Natural Gasoline," by E. W. Zublin, Texas Pacific Coal & Oil Co. and S. S. Smith, Shell Petroleum Corp. The discussion of the paper is to be led by R. B. High, Shell Petroleum Corp.

The second paper to be read in the morning session of May 21 is on "Natural Gasoline Specifications from The Refiners Viewpoint." It is prepared by M. H. Nolan, of the Producers & Refiners Corp. A discussion of this paper will close the morning session.

A sales paper, by W. K. Warren, Warren Petroleum Co., and a discussion by D. E. Buchanan, of Hanlon-Buchanon, Inc., will occupy the first part of the afternoon period. "Outage," a paper by Emby Kaye, Skelly Oil Co., will follow. A paper on Industrial Relations, by Isaiah Hale, Safety Superintendent of the Santa Fe System will close the session for the second day.

The program the last day of the meeting will be presided over by D. E. Buchanan. The first event of the morning session will be the hearing the report of the research program, by Dr. George G. Brown, of the Department of Chemical Engineering, University of Michigan. The hearing and discussion of Dr. Brown's report is expected to consume the entire morning period.

The afternoon session of the last day will hear the report of the gas testing committee, headed by George P. Bunn, Phillips Petroleum Co. Other papers which will follow during the last of the session, are "Aviation Fuel," by R. C. Alden, and Billy Parker, Phillips Petroleum Co., and the "Theory of Absorption," by A. Kremser, of the Standard Oil Co. of California. Discussion of the former paper will be led by E. G. LeFevre, Empire Oil & Refining Co., and of the latter by G. G. Oberfell, Phillips Petroleum Co.

Several of the papers to be read are in effect committee reports outlining what has been accomplished by various committees of the association during the past year. The sub-committee on aviation gasoline has been doing research work with particular reference to studying the vapor lock tendencies on the highly volatile aviation gasolines.

Additional work has been done by the sub-committee headed by L. G. Rheinberger, Sinclair Oil & Gas Co. in the study of the residue gas curve, and much additional data is said to have been compiled.

The technical and specifications committees, in addition to their regular work, have reviewed the two distillation methods for motor fuel and natural gasoline, and have made recommendations to the American Society for Testing Materials with the idea of bringing the two methods closer together.

An attendance of around 750 is expected this year. The program committee, consisting of S. S. Smith, Shell Petroleum Corp., Emby Kaye, Skelly Oil Co., and F. E. Rice, Phillips Petroleum Co., have arranged the program along as varied lines as possible. Social functions, such as a stag smoker the first night of the convention, and a dance the second night, May 21, have been arranged.

Phillips to Build New Panhandle Plant

CLEVELAND, April 28.—Phillips Petroleum Co. is to build a 40,000,000-foot natural gasoline plant in Gray county in the Texas panhandle it was announced today. The new plant is to be of the absorption type with two distillation units designed to produce 60,000 gallons daily. The compressor equipment will include 21 units.

The new plant will draw gas from 2600 acres of potential and producing gas leases. The company now has five plants in operation in Gray county. The new plant will be Phillips' No. 47. It will be ready for operation in about 90 days.

Correction

In the Dec. 25, 1929 issue of NATIONAL PETROLEUM NEWS. page 110, it was stated that the Northwestern Petroleum Co. of Osage, Wyo., was distributing Havoline motor oil through Oregon. It is the Northwestern Petroleum Co. of Portland, Ore. that is the distributor of this oil in Oregon.

The Pennsylvania Oil Co., a subsidiary of the Northwestern company, distributes this oil through Idaho, according to J. R. Mathews, general manager of the former company.

Tide Water Moves

NEW YORK—Offices of the Tide Water Associated Oil Co. and the Tide Water Oil Co., which have for a long time been at 11 Broadway, were removed on April 28 to the Whitehall Bldg., 17 Battery Place, New York.

Common Problems of Automotive and Oil Industries Before N.P.A. Meeting

By Arch L. Foster
N. P. N. STAFF WRITER

CLEVELAND, April 25

EASTERN refiners who make up the National Petroleum Association looked into the future of the internal combustion engine, considered common problems of the automotive and oil industries and discussed the overproduction of petroleum and its products at the annual spring meeting held here April 23 and 24. Technical problems in the production of lubricants were considered and progress reports made by heads of various departments of the association.

The disasters that have followed in the wake of overproduction in other industries in recent years were illuminated for the benefit and warning of the oil industry in its present crisis, by President E. M. Lyons in his address. The copper and coal industries have suffered demoralizing reverses in recent years on account of their failure to fit their production of material to the consumers demand. Intelligent consideration of their mistakes should induce the oil producers and refiners to put their own house in order now, when increasing stocks of crude and manufactured products threaten seriously to undermine the entire oil price structure.

In discussing the achievements of the oil industry to date, Mr. Lyons pointed out that 775,000 wells have been drilled in this country of which 335,000 are now producing, and have yielded some sixteen billion barrels of oil. The speaker showed that well drilling has been greatly stimulated by increases in the demand for petroleum products, but that a falling off of demand has not had its proper result in curtailing drilling until overproduction has imperiled the price structure and the stability of the industry.

The speaker stated that it has always been the purpose and practice of the oil men to carry comparatively large surplus stocks of crude and refined oils, as insurance against a possible shortage of oil. These stocks have grown in size until it is necessary to reduce them in order to relieve the burden of carrying expense; in 1929 the amount in storage was 39.6 per cent of the total year's production.

Drawing an analogy between the oil and copper industries, the speaker reviewed the facts in recent copper history. The price over several years has fluctuated over a wide range; in 1929 132,500 tons of copper remained unsold, with the price at 18 cents per pound; production by the forty companies which control the major portion of the copper output was curtailed, but in this the smaller independent companies have failed to cooperate, with the result that of April 15 the price of copper was reduced to 14 cents, a price at which many of the smaller operators cannot manufacture at a profit. The oil fraternity is faced with an almost exactly similar problem, and to overlook the "handwriting on the wall" will be even more disastrous, in the speakers opinion.

"The Oil Industry is indebted to President Hoover, to the Federal Oil Conservation Board, to Secretary Wilbur personally, to President Reeser and the American Petroleum Institute and the other organizations in the Industry; to the Oklahoma State Corporation Commission; to the Texas Railroad Commission and to the producers of oil, particularly in the States of Oklahoma, Texas and California, for the success obtained in the curtailment and conservation movement. * * *

"The Oil Industry cannot expect a few far sighted companies to do all that is necessary to bring about a balance between supply and demand. It is clearly the duty of each individual company, no matter how small, and no matter how large, to assume its share of the responsibility, and in so doing to secure its share of the prosperity. This is a matter which cannot be made the subject of agreement, but it is within the province of individual intelligence.

"Every association has the legal right to assemble and make public the statistical facts, but the intelligent action which those facts require is the responsibility of each individual company."

In presenting his report of the activities of the Department of Standards and Tests, O. P. Keeney reviewed briefly the beginnings of the department ten years ago. At that time no standard specifications or methods of test for petroleum products existed, and the earlier efforts of technologists toward standardization were met with apathy, opposition and even derision. Among the accomplishments of this department during the intervening years is the development of standard colors for petroleum products.

Statistics of Finished Gasoline

Volume Figures in Barrels of 42 Gallons

Year	Stocks of Gasoline: Maximum	Minimum	Fluctuation in Stocks	Stocks Dec. 31st	Inc. or Dec. over Previous Year	Number of Day's Supply: Max.	Min.	Total Supply: Barrels	% Yearly Inc.
1918	12,532,000	5,960,000	6,572,000	7,079,000	— 2,736,000			89,589,000	25.97
1919	14,143,000	8,432,000	5,711,000	10,637,000	+ 3,558,000	56	32	99,850,000	11.45
1920	15,332,000	6,861,000	8,471,000	11,009,000	+ 371,000	54	21	123,221,000	23.41
1921	19,059,000	10,863,000	8,196,000	13,954,000	+ 2,945,000	55	31	132,364,000	7.42
1922	21,244,000	16,429,000	4,815,000	21,042,000	+ 7,088,000	58	40	165,489,000	25.03
1923	33,665,000	25,320,000	8,345,000	28,014,000	+ 5,137,000	71	48	203,971,000	23.25
1924	41,821,000	29,607,000	12,214,000	30,820,000	+ 2,806,000	74	48	231,947,000	13.72
1925	41,512,000	35,572,000	5,940,000	38,875,000	+ 8,054,000	63	50	276,778,000	19.33
1926	46,121,000	33,257,000	12,864,000	39,023,000	+ 148,000	60	40	312,522,000	12.91
1927	52,532,000	30,258,000	22,274,000	33,316,000	— 5,707,000	60	32	344,599,000	10.26
1928	41,195,000	26,378,000	14,817,000	33,066,000	— 250,000	42	25	391,055,000	13.17
1929	48,205,000	33,222,000	14,983,000	43,115,000	+10,049,000	44	29	452,930,000	16.14

which have been adopted by the entire American industry.

Recent efforts of N.P.N. technologists have been directed toward uniformity of test results in the tests already adopted as standard and tentative standard by the industry, through cooperative testing and comparison of test results obtained on standard samples tested by cooperating laboratories. In a study of test results on flash, fire, viscosity, etc. on lubricants 51 laboratories have cooperated, preliminary comparison and tabulation of data have been made, and the work is still in progress. The laboratories are divided into seven groups for convenience. The speaker urged that those companies whose laboratories are not yet included in the groups look into the matter, consider seriously the advantages to be derived from such cooperation, and to cooperate with the others to mutual advantage.

Members of the department of standards and tests will meet at the Bureau of Standards and discuss their problems with the technical men of the latter organization on June 6, among the subjects to be considered being anti-knock tests, motor fuel volatility, gum and sulfur content, and vapor lock, and the significance of, and testing for such properties of motor oils as stability and service tests, carbon residue, oiliness, fluidity, etc.

Discussing the commercial and trade activities of the association N. H. Weber of the Pure Oil Co. outlined the plan the Bureau of Mines' Petroleum Statistics Division adopted at the beginning of this year for reporting the production of Pennsylvania Grade Crude oil in its monthly and annual statements, separately from the production on this geographic area of crudes which are not classed as of that standard grade. By means of this segregation of statistics the refiner will be supplied with exact data regarding the current supply and demand of this crude, and such definite information should enable the refining industry in Pennsylvania to avoid overproduction of crude or refined products with ease and certainty, the speaker stated.

According to the statements of A. M. Maxwell of the Standard Oil Co. of Ohio, the refiner has three main points to consider in improving sales and his sales organization; quality of product, quality of advertising, and quality of personnel. The first is the problem of the manufacturing department; the second that of the advertising organization and the third is the concern of the entire body of company executives.

C. F. Kettering, President of General Motors Research Corp., in an address on the relation of the oil industry to progress in the automotive industry stated that three commodities are to the latter all-important, rubber, steel and steel alloys, and motor fuel. According to his estimate rubber is the most important of these to the motor manufacturer, and the rubber technologist has attained 65 to 70 per cent of the development that may be expected of him. In metals the development may be considered as having accomplished 40 to 50 per cent of that eventually attainable, or that must be attained in order to realize the greatest advantage possible from this material.

The fuel problem is being attacked concertedly and with some success, but it is considered that the oil industry has accomplished only 30 to 40 per cent of the work that must be completed before motor fuels are entirely satisfactory, according to the speaker. Most of this problem lies in the field of detonation and the development of a fuel which will not knock.

Given a fuel which will not produce a detonation wave when exploded in the cylinder, the motor manufacturer is able to realize, in the automotive engine, all the advantages of the Diesel cycle without many of the latter's disadvantages. Such a fuel would permit a 35 to 40 per cent reduction in motor weight, and an improvement in fuel economy of 25 to 30 per cent, the speaker stated. Specific fuel consumptions as low as 0.38 pounds per horsepower-hour can be obtained with a proper knockless fuel, it was stated.

(*Continued on Page* 40-e)

Gasoline Overproduced for Twelve Years

CLEVELAND, April 26

THE effect of persistent overproduction of gasoline during 12 years, on the refining industry of this country was pointed out to those attending the meeting here this week of the National Petroleum Association in a table prepared under the direction of Fayette B. Dow, general counsel for the association. The table is published on the accompanying pages.

Study of the table shows, it was pointed out, that, in only three years out of the 12 from 1918 through 1929, have stocks been reduced at the end of the year from the previous year. These three years were 1918, a war year, and in 1927 and 1928.

In 1927 occurred the biggest change in any year between maximum gasoline stocks during the year and minimum stocks, a fluctuation of over 22,000,000 gallons. Stocks reached their highest point of the twelve-year period, over 52,000,000 gallons during this year, and the result was the largest drop in wholesale prices of any period.

The lesson learned in 1927 was heeded in 1928 and maximum stocks were the lowest in five years and minimum stocks the lowest in three years, stocks at the end of the year showing a very moderate change from the year previous.

The better conditions prevailing in 1928 brought a recurrence of overproduction in 1929. There was a greater increase in stocks during that year than in any other of the 12-year period.

The effect of the persistent overproduction on prices resulted in a drop of the wholesale tank car market in Group 3 from an average high point of 21.5 cents a gallon in 1919 to an average of 7.72 cents in 1929.

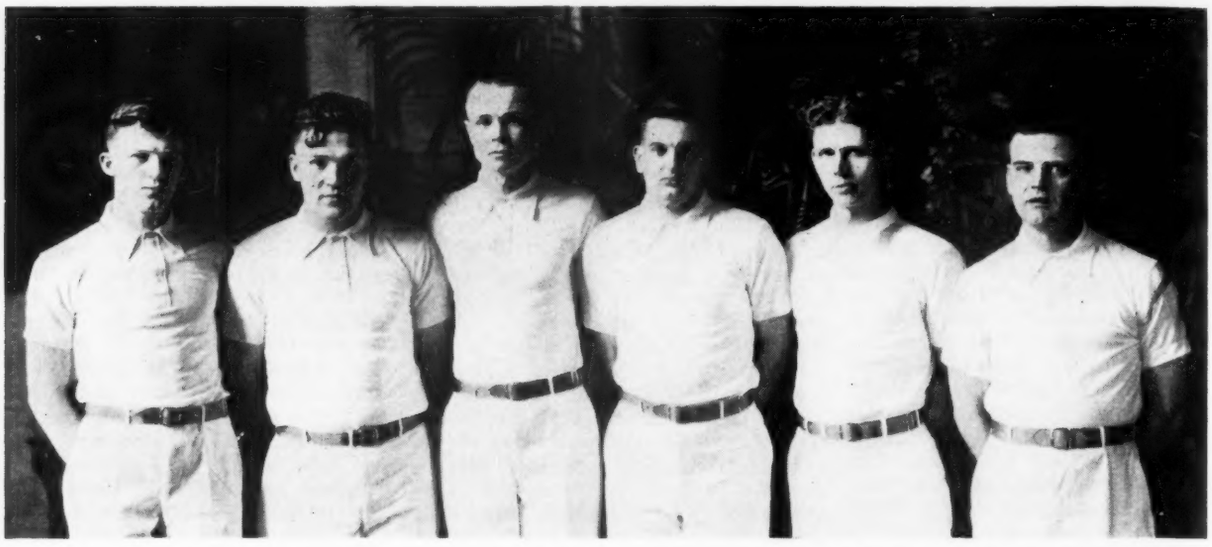
"The obvious conclusion," pointed out Mr. Dow, in discussing the chart, "is that the industry has not mastered the principle of balance in its operations. Periods of temporary improvement are followed by periods of increased overproduction."

n United States for Twelve Years

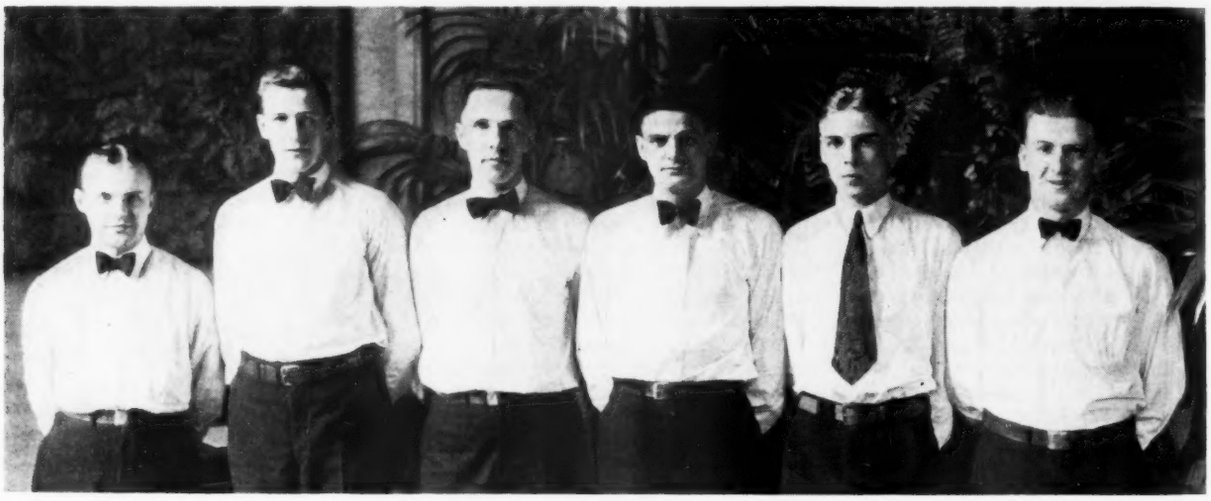
Volume Figures in Barrels of 42 Gallons

Total Demand		% of Stocks to Total Demand		Group 3 Prices Cents per Gal.			Gulf Cargo Prices Cents per Gal.			Okla. 36° Gravity Crude Price			
Barrels	% Yearly Inc.	Max.	Min.	Max.	Min.	Avg.	Max.	Min.	Avg.	Max.	Min.	Avg.	Year
92,326,000	32.78	13.57	6.46										1918
96,291,000	4.30	14.69	8.76	18.75	15.75	17.42	22	17	19.5	$2.75	$2.25	$2.30	1919
122,850,000	27.58	12.48	5.58	23.75	16.00	21.52	22¼	17	21.3	3.50	2.75	3.43	1920
129,419,000	5.35	14.73	8.39	21.00	11.00	14.37	21¼	16	18.1	3.00	1.00	1.63	1921
158,401,000	22.39	13.41	10.37	18.88	10.59	14.47	19½	15	17.4	2.00	1.25	1.68	1922
198,883,000	25.53	16.93	12.73	14.12	6.34	10.10	16	10	13.3	2.00	1.00	1.56	1923
229,141,000	15.24	18.25	12.92	11.36	6.97	9.16	14	10	12.5	2.00	1.00	1.64	1924
268,724,000	17.27	15.45	13.24	12.93	8.50	10.64	14	10	11.9	2.04	1.25	1.87	1925
312,374,000	16.24	14.76	10.65	11.75	9.20	10.45	12¾	10	11.3	2.29	1.79	2.13	1926
350,306,000	12.14	15.00	8.64	9.10	6.10	6.85	11	7	8.0	1.90	1.28	1.38	1927
391,305,000	11.40	10.53	6.74	9.73	5.93	7.97	10	6¾	8.7	1.36	1.28	1.31	1928
442,881,000	13.49	10.88	7.50	9.22	6.93	7.72	8½	7¾	8.0	1.45	1.20	1.37	1929

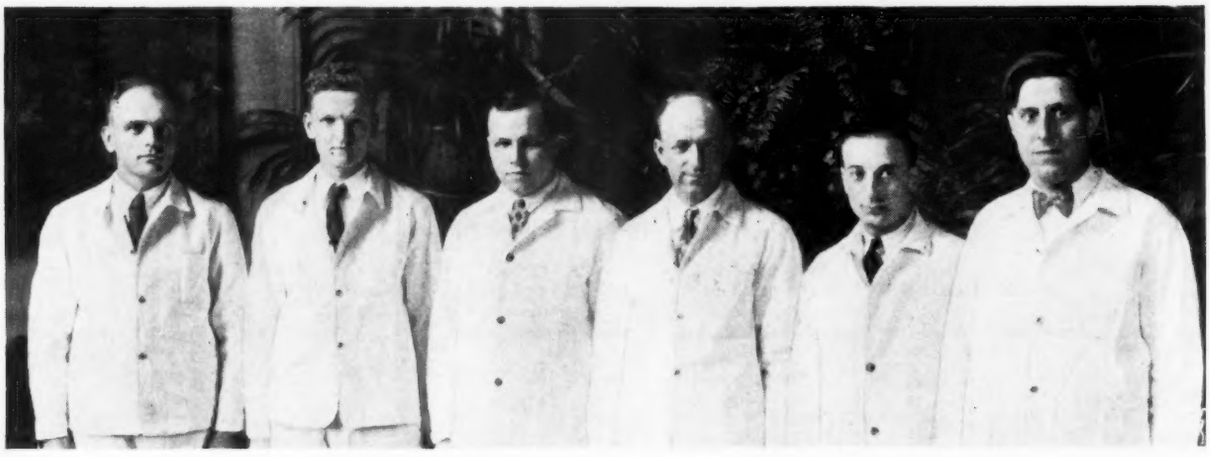
Teams Competing in N. P. A. First Aid Contest



Winning team in the first aid contest entered by the Conewango Refining Co., Oil City, Pa. Left to right: K. Bailey, N. M. English, K. B. Brogan, C. H. Lindberg, Capt., S. A. Sharman and Arthur Barr

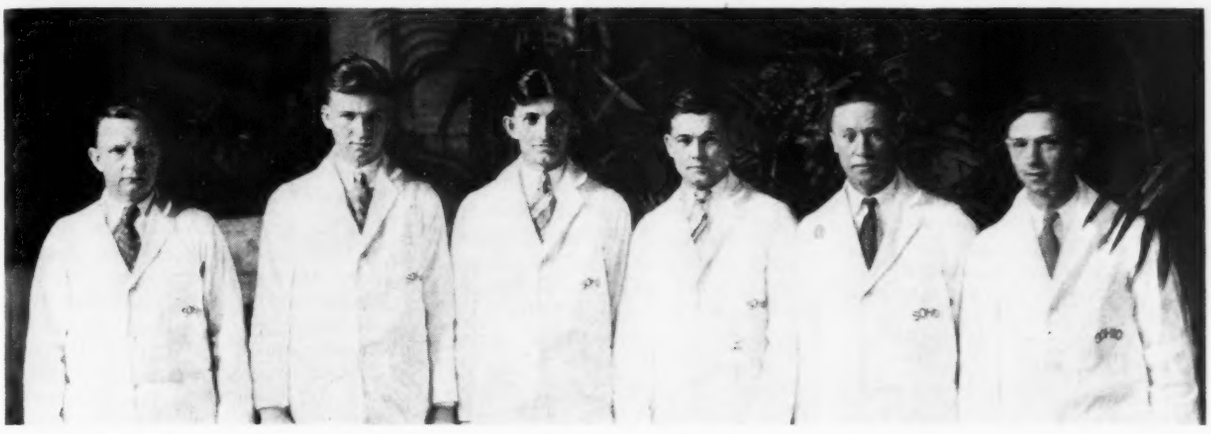


Kendall Refining Co.'s team won second place in the contest. Members of the team from left to right: C. Hulme, Capt., L. Akerlind, E. Brown, B. Herman, E. Walker and A. Dininny

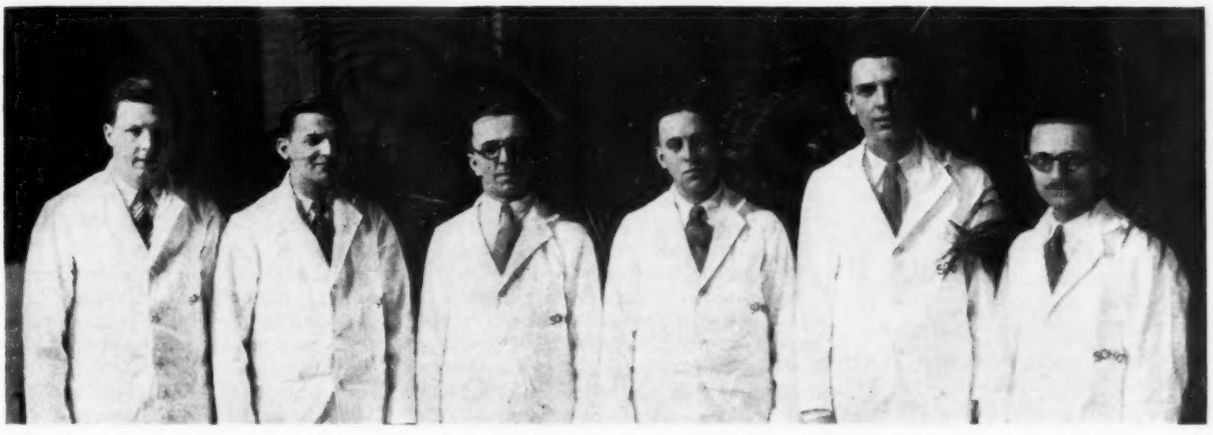


Independent Refining Co. first aid team from Oil City. Left to right: W. R. Snyder, Capt., R. S. Nelson, E. J. Potts, C. M. Cook, J. J. Lehnortt and F. H. Allen

Teams Competing in N. P. A. First Aid Contest



Standard Oil Co. of Ohio entered two teams. The one pictured above is from No. 1 works at Cleveland. Left to right: William Ney, Capt., Michael Durik, John Scardon, G. R. Thompson, Jack England and Edward Tabor



Standard Oil Co. of Ohio No. 2 works team: Richard Graham, Capt., Walter Osiecki, Joe Komarowski, Tom Looby, Gene Fox and Al Pence

(*Continued from Page* 40-c)

Mr. Kettering further stated that the conversion of the railroads of the United States to internal combustion engines as prime movers will be controlled directly by the advances in the development of non-detonating fuels, and the use of Diesel or automotive types of engines will depend on the nature of the fuels provided by the oil technologist for these two types of motors. In the opinion of the speaker, given proper steels, rubber, motor fuel, and express highways, it is doubtless feasible to carry the mail from New York to San Francisco by automobile at a faster average rate of speed, 365 days in the year, than by any other mode of conveyance now known to man.

The speaker further pointed out that the refiner is doing himself an injustice in failing to impress on the motoring public that fact that gasoline retail prices are lower in comparison than the price of any other indispensable commodity. Even mineral water cost more per gallon than does the best grade of premium motor fuel, and the average user seems to be unaware of these facts.

"For the first time in the history of our industry we are now approaching a balance between production and consumption," is the statement made by E. B. Reeser, President of the American Petroleum Institute, "regardless of the fact that we have the greatest potential production ever known." The recent history of the copper industry shows what results when a portion of an industry fails to cooperate for the common good.

Discussing the breakdown of older conditions wherein each group of refiners had practical control of their own locality's markets, Reeser stated:

"The time has passed when any territory can claim for its own, any portion of the markets of the world. Under the old law of the 'survival of the fittest,' a very large percentage of independent refiners, or producers, in the United States could be driven out of business by those more favorably located. It is not in the interest of the public that such a policy should prevail. Fortunately, it is not the desire of any group to crowd others out of business. It is within the legal rights of every refiner to study the statistics and to determine for himself, how much he should curtail his operations in order to sell his products on a remunerative basis. Efficiency, based on low costs per unit of output, is no longer the basis on which to operate. Webster defines 'efficiency' as 'the quality that produces the best possible results or the most effective service.'"

The speaker urged the individual refiner to study the reports of the situation as issued regularly by the Institute and the Bureau of Mines and to govern his own operations by the indications shown in these reports. In this way refiners will be practicing real efficiency and by such means the balance between production and consumption may be maintained.

In comparison with the statements made earlier regarding the "open house" methods of the automotive industry, P. S. Tarbox of the Independent Refining Co. pointed out that the large majority of modern refiners

throw open their plants to the inspection of visiting refiners, discuss their methods and problems and in general disseminate to all interested the results obtained in their several investigations for improving operating methods.

For the last four years Pennsylvania refiners have been cooperating in the study of fuel efficiency, in an endeavor to reduce the amount of fuel required to operate plants. This work has been carried on under the supervision of H. A. Ross. As a result of the investigations carried out by the group, the fuel consumption in the refineries represented was reduced in 1929 about 40 per cent below the 1928 figures; and the total cost of the work was about $600 per company, the speaker stated.

In discussing oil refining conditions and development in Russia at the present time, Harold S. Bell stated that a great effort is being made to bring Russian methods up-to-date and with excellent results. Much of the plant equipment in the Russian refineries up to a few years ago was inefficient compared to that used in other countries, and some of this equipment is still used, but is fast being supplemented or supplanted by more modern plants of both American and European design. Russian engineers have proven themselves to be competent and ingenuous, especially in the handling of distillation problems, and it expected by 1933 that the program of improvement and expansion will have been completed.

In production equipment and practice, the speaker reported that rotary drilling apparatus or American design is used mostly, and that modern practices and methods are the rule. The use of the air-gas lift is being employed, to good results, 38 per cent of the production of crude being obtained from 8 per cent of the total number of wells drilled, with the aid of gas lift methods.

Mr. Bell showed three reels of scenes taken during his recent visit to the Soviet Republic, which included pictures in Moscow the capital, and in several towns and cities in South Russia, as well as of the large refineries in the Baku district and the Surakhany and Belakhany fields.

In reviewing the recent developments in the manufacture of motor lubricants, D. G. Brandt of Henry L. Doherty Co. stated that the main items of improvement of the technology has been in the use of vacuum distillation, mechanical mixing for treating, and centrifugal sludge separators, the use of which has materially reduced costs and improved the quality of products for a large number of refiners. This paper is printed elsewhere in this issue of NATIONAL PETROLEUM NEWS; G. C. Davison's paper on "Scientific Research" and Warren C. Platt's study of the economics of the oil industry were published in the April 23 issue.

Following a short discussion of the aims and purposes of the department of fire prevention and safety by R. A. Wotowich, Trustee in Charge, and a practical outline of methods for increasing the scope and effectiveness of that department, a first-aid contest was held between five competing teams. These teams represented the Kendall Refining Co., Independent Refining Co., Conewango Refining Co., and the two Cleveland plants of the Standard Oil Co. of Ohio. The contest included demonstrations of first-aid work on three problems, and was in charge of J. H. Herbert, supervised and judged by James M. Webb and W. J. Fene of the Safety Division of The U. S. Bureau of Mines, and resulted in the Conewango team winning first place and the Kendall team second place.

Only two points separated the first two teams and the last team in the scoring was only 41 points behind the Conewango team. A high degree of skill in giving first aid to badly injured men was shown in the contest. The winning team was awarded a bronze plaque to keep until the next contest and each member was awarded a medal.

The annual Fellowship Supper of the National Petroleum Association meeting was held at the Hermit Club, the program being under the direction of Fred G. Clark, of the Fred G. Clark Co., Cleveland. Following the dinner entertainment was provided, largely by home talent within the organization.

Cross Licensing of Patents Benefits Auto Makers

COOPERATION through association work has been a great factor in the growth and progress of the automobile industry, Alfred Reeves, general manager, National Automobile Chamber of Commerce, told the National Petroleum Association, at its April 23rd session.

"In production, scientific development, and educational work, unity of effort and broadminded interest in each other's problems affect economies for the public at large and have proved to be sound practice for the industry," said Mr. Reeves.

Economy in the production of cars has been greatly helped by the extent to which information has been exchanged among the manufacturers, he stated. He cited instances where one company which contemplated using a type of brake another company had experimented with a good deal had been invited by the latter company to send its engineers to its plants to get the full benefit of their experience and possibly save the public the cost of doing much of this experimental work a second time.

He told another case where engineers from a German company asked permission to make an inspection trip through the Packard factory. Not only were they given the permission; but they were furnished with paper and pencil and told to make drawings of any of the machinery in which they were interested.

Another company which desired to re-tool and re-plan its factories was invited by a competitive company to inspect its plant and make whatever blueprints they wanted.

Mr. Reeves cited particularly the benefits of the cross-licensing of patents in the automobile manufacturing industry, whereby each company allows the others to make free use of the devices on which it has patents, and in turn received hundreds of licenses in exchange. He said there were more than 1500 patents included under this cross-licensing agreement; and that a new agreement had recently been signed by the leading car manufacturers of the country extending the period of exchange of patents for another period of years.

By these agreements he said the individual manufacturer had the exclusive right to patents on drastic or radical changes which were brought out during any particular period of the agreement; but that all patents on inventions prior to that period were freely interchanged.

"This arrangement provides for the making of a vast number of detailed parts according to standard sizes and in vast quantities, which means a great saving in cost to the manufacturer and lower prices to the public," said Mr. Reeves.

As each new problem in motor transportation has come along, the automobile industry has tried to solve it on a cooperative basis, he said, for the general benefit of the public. He pointed out that, early in the days of the motor truck, the automobile industry encouraged rural motor express routes and return-load bureaus, practices which are now in common use. The automobile chamber of commerce has issued data on training commercial drivers, cost accounting, standardized servicing of vehicles and so on.

"The automobile industry has always had the view that, if you sell the idea of motor transportation, markets will be widened and there will be more business for all," Mr. Reeves concluded. "We are proceeding along these lines in the foreign field, not alone on behalf of the American product as such, but rather just encouraging the world to drive, convinced that, out of the public interest aroused, America will get its share of the trade."

Motor Oil Coolers Needed to Permit Use of Lower Viscosities

By D. G. Brandt*

(Presented before National Petroleum Association, Cleveland, April 23-24)

BEFORE discussing the modern trends in the manufacture of motor lubricants, it is perhaps advisable to first review the changes in automobile engine design that are responsible for the present trend. The competition of various automobile manufacturers and the development of better roads has resulted in the production of a machine of high mechanical dependability having a driving speed range from five to ninety miles per hour in high gear. Traffic conditions and the increased number of machines in operation have made the rate of acceleration one of the major factors in design.

In order to meet these conditions, the maximum developed horsepower required has been ever on the increase. This increase in horsepower has been accomplished by increasing the piston displacement, speed and compression ratio of the engine. A comparison of a group of cars of five years ago with corresponding cars of today illustrates how decided this change has been. The cars compared were of the same make, type, and had the same number of cylinders.

In the case of piston displacement, an increase of 7 per cent was found and there was a corresponding increase in the compression ratio of 12.2 per cent. The average figures for the compression ratios were 4.46 to 1 and 5.0 to 1, showing an increase of 0.54 over the five-year period.

Engine R.P.M., Horsepower And Road Speed Increased

The increase in speed is marked, as the average R.P.M. at maximum developed horsepower five years ago was 2443, whereas today it is 3014, which is an increase of 23.4 per cent. In the case of maximum developed horsepower, the increase has been remarkable, showing a gain of 52 per cent, or from 52 to 79 horsepower over the five years.

As mentioned above, the figures quoted are not the figures of the overall increase in the factors mentioned, but represent only a selected number of representative cars on which a direct comparison could be made. As the maximum developed horsepower increases, the operating range also increases inasmuch as the minimum power requirement remains fixed.

We have lengthened the driving range, but the average driving speed has not increased proportionally because of the increase in traffic. However, on the open road the average driving speed has increased from approximately 35 to 50 miles per hour. Thus we actually have two average conditions that are widely different, that is, the car must function properly at a comparatively low driving speed, with quick acceleration in traffic, and at high driving speed under open road conditions.

Starting Difficulties Reduced Little by Low Pour Oils

This wide variation of operating conditions has introduced new complications in the lubricating problem and because this change has been gradual over a period of years, the production of a lubricating oil for the service has been a continuous research problem. The automobile manufacturer has assisted in this problem by equipping the engine with forced feed lubricating systems, oil filters and crank case ventilators, all of which prolong the life of the lubricant used and help to maintain the original viscosity of the oil.

There has been a constant increase in the viscosity of the lubricant used in the automobile engine as the speed and compression ratios increased. The viscosity of the lubricants have now increased to a point where we are experiencing carbon formation in the cylinders and valves due to the breakdown of the heavy oil and difficulty in starting and lubrication during cold weather. This is a direct result of the low fluidity and tendency toward plasticity of the heavier lubricants at frigid temperatures.

The production of low cold test oils is helping to improve the situation but much difficulty is still encountered because of the high shear stresses at low temperatures and the fact that during the starting period practically no lubricant reaches the cylinder walls. This is due entirely to the fact that even though the pour point of the lubricant is low its plasticity at the lower temperatures is high and the splash system of delivering lubricant to the cylinder walls is not effective as long as the temperature of the lubricant remains low. This causes undue wear on both the piston and cylinder walls during the starting period in cold weather provided the lubricant is cold at the time of starting.

The cranking effort necessary under these conditions is high and increases rapidly with the viscosity of the lubricant. Difficulty in pumping the lubricant is encountered for the same reasons and it is found that the lubricant must reach its pour point temperature before pumping will be satisfactory. For this reason the pour point of lubricants has been given major consideration and it has been found possible to produce oils from almost any type of crude oil of substantially zero pour point. Although these oils are now being produced commercially they have failed to materially reduce the starting difficulties, due to the plasticity of the lubricant at low temperatures.

Threefold Purpose of Lubricant: Lubricate, Seal, Cool

Fundamentally, the lubricating oil in an engine performs three major functions, first, lubricating the moving parts; second, sealing the pistons; and, third, cooling. First, from the standpoint of lubrication of moving parts, it may be pointed out that in the development of other high speed machinery the trend has been toward a lubricant of lower viscosity.

If the coefficient of friction were plotted against a modulus $\frac{ZN}{P}$, in which Z is the relative viscosity of the fluid, N is the speed of the bearing surface, and P is the normal pressure on the bearing surface per unit area, it would be noted that as $\frac{ZN}{P}$ approaches zero the coefficient of friction increases rapidly and, also, that as the value of $\frac{ZN}{P}$ becomes greater, the coefficient of friction increases very slowly. The zone of unstable lubrication is that portion of the curve where the film of lubri-

*Henry L. Doherty & Co.

cant is broken and the value of the modulus $\frac{ZN}{P}$ approaches zero. Stable lubrication is represented by the right hand portion of the curve where the coefficient of friction rises slowly with a corresponding increase in value of $\frac{ZN}{P}$. Thus for a given speed and pressure there is required an oil of sufficient viscosity to maintain stable lubrication.

For high speed machinery operated at constant speeds, the selection of a proper lubricant is relatively simple, but in the case of the present day atuomobile engine operated at a wide range of speeds, the selection is not so easy. The selection, however, should be made so that at slow speeds lubrication will be stable and the coefficient of friction low. This would necessarily make the coefficient of friction greater at high speeds, but in order to secure stable lubrication at all speeds some efficiency must necessarily be sacrificed. From this reasoning it is evident that the proper oil for lubricating purposes does not need to be extremely viscous and that the heavy oils now being used were selected for other reasons.

Considering the changes that have resulted in the present day automobile, it must be borne in mind that difficulty in securing a satisfactory piston seal would be a direct result of the greater operating range of the machines and the higher compression ratios. It has already been mentioned that, although the approximate driving speed on the open road has risen as high as 50 miles per hour, the usual driving speed because of traffic conditions is not materially higher than it has been in the past and the percentage of idling time has increased.

Confronted with this condition we find that when operating at low speeds a decided vacuum is created in the cylinders on the intake stroke and that some of the lubricant is drawn into the cylinder although the seal is not broken. Likewise when operating at high speeds, difficulty is also encountered in the loss of lubricant. However, in this case the difficulty results from the higher temperature of the cylinder walls and the reduced viscosity of the lubricating oil film forming the piston seal.

Difficulties Encountered During Idling Time

At the higher speeds the piston ring does not wipe the wall entirely clean on the down stroke and on the compression stroke this oil is carried into the combustion space by the piston. In the case of the older engines the normal operating speed was closer to the maximum operating speed and the difference in cylinder and crank case pressures was not so pronounced. Likewise, inasmuch as operating speeds were lower, temperatures were not so high and the securing of an effective piston seal, even with the less viscous oils, was not difficult.

The rapid loss of viscosity with temperature should receive considerable attention, for although there is very little information available as to piston working barrel temperatures, it is not unreasonable to assume that they are as high as 430 F.

If the absolute viscosity of an oil is plotted against temperature on logarithmic paper a straight line is secured. If the lines of three lubricants of different viscosities, but from the same crude oil base, such as of S. A. E. 30, 40 and 50 viscosity range are plotted, it will be found that the lines converge at the higher temperatures indicating that lubricants having a wide variation in viscosity at test temperatures have substantially no difference in viscosity at high temperatures. Thus, I believe that a more effective seal could be produced by the reduction of the operating temperature of the lubricant than by increasing its viscosity as measured at the usual temperatures.

Installation of Oil Cooler Would Aid Motor

The third duty of an automobile lubricant is the cooling of bearings and moving parts. Under present conditions the temperature of the crank case rises from the starting temperature to an average of from 130 F. to 150 F. Increased engine speeds and bearing pressures have made the splash system of lubrication inadequate and practically all manufacturers have adopted forced feed lubrication, or what might be more correctly termed forced oil circulation, to supplement the splash system. The oil is pumped from the crank case through the bearings back to the oil pan where the only means of cooling is by radiation. If the oil pan were insulated and a cooler installed in the oil pump discharge line, more adequate cooling could be provided which would compensate for the wide range of climatic conditions and driving speeds.

As previously mentioned, the automobile manufacturer has endeavored to extend the life of the lubricant and maintain the original viscosity, but very little attention has been given to temperature control of the lubricant necessary to maintain a constant viscosity under operating conditions. This could be accomplished by an independent controlled cooling system with several resulting advantages. First, by supplying precooled oil to the bearings for cooling, the quantity of oil circulated could be reduced. Second, it would be possible to use a cooled lubricant of lower viscosity for lubrication and reduce the friction of the moving parts. Third, if a forced supply of a precooled lubricant with constant circulation or replacement was supplied for sealing the pistons, an effective seal could be secured with an oil of relatively low viscosity at test temperatures because of the reduced temperature.

From this it is evident that if the proper provisions were made for temperature control of the lubricant, it would be possible to use a less viscous oil than that now in use and at the same time increase the efficiency of lubrication. It is a well known fact that starting and lubricating troubles at low temperatures decrease with decreased viscosities of lubricants. It is also true that the carbon residue decreases with decreased viscosity. Hence, I believe that the automobile engine can be most efficiently lubricated by the use of a less viscous oil and equipment to maintain the viscosity constant by means of temperature control.

It is my opinion that the trend will be toward lubricants of lower viscosities, lower pour points and having as flat a temperature viscosity curve as possible, but lower viscosities will only be used after the engine manufacturer has installed temperature regulation in the lubricating system. In the manufacture of such high quality lubricating oils, the selection of the proper crude oil is of major importance.

Crude oil is classified into three divisions, namely, asphalt base, paraffin base, and mixed base. The last mentioned is a mixture of the first two and its physical and chemical properties will approach either those of asphalt base or paraffin base, depending on the relative percentage of the two substances present in the crude.

An inherent characteristic of lubricants prepared from asphalt base crudes is the low cold test that may be obtained without special processing. However, the slopes of their temperature-viscosity curves are steep and at pour point temperatures they deviate widely from the laws of viscous flow. Their volatility is high, with a low carbon residue, for this reason.

Can Obtain Low Pour Point From Paraffin Oils

On the other hand, we find that without special processing the paraffin base oil solidifies at frigid temperatures because of the precipitation of wax. With special processing, however, it is possible to obtain a product having a cold test equivalent to that of asphalt base oils. The lubricant prepared in this manner follows the laws of viscous flow more closely at pour point temperatures than the asphalt base lubricants, although there is some divergence.

The volatility of the paraffin base lubricant is lower and the carbon residue is higher than in the case of lubricants of the same viscosities prepared from asphalt base crudes. A marked characteristic is the relatively

flat temperature-viscosity curve of the paraffin base oil.

As pointed out, lubricants made from the two crude oils have some physical and chemical characteristics which cannot be changed by processing, and both research and actual performance have demonstrated the superiority of those made from the paraffin base crude oils.

However, during the last few years asphalt base lubricants have been widely used due to their low pour test and carbon residue. This competition, coupled with the possibility of increased yields, has awakened the Pennsylvania refiner to the development and use of more scientific methods, which has resulted in increased yields, better lubricants and reduced costs of production.

Great Improvements Shown In Distillation Equipment

The improvements made have been in practically all branches of the refining industry and the improvement of one branch has assisted and hastened the improvement of others. The major improvement has been made in the distilling equipment by the use of modern pipe stills and fractionating columns. Practically all of these units are of the atmospheric single flash type. In this type of unit all the oil above the bottoms product is vaporized in a body and the vapors are then separated into the various cuts in the fractionating column. With this system, very close fractionation is obtained and it is possible to produce substantially all cuts without rerunning. These units are very flexible and cuts can be varied as to boiling range or viscosity to suit the products desired.

The use of such distilling apparatus produces wax distillates and cylinder stock bottoms of better colors, and simplifies the wax removal, as well as increases the yield of viscous oils. Such equipment and also vacuum units built along similar lines have been used for rerunning and reducing pressed wax distillates and bright stock solutions.

The demand for low cold test lubricants has made it necessary to manufacture both neutral and bright stocks of substantially zero cold test. The methods used are special pressing, centrifuging, filter aid methods and solvent extraction.

Neutral oils are being dewaxed in very nearly the same manner as in the past, the only variation being that special or double pressing is being resorted to in order to secure approximately zero cold test products. The process of dewaxing by pressing has been used for a number of years and only the changes that have been made in order to secure wax free oils will be discussed.

The use of direct ammonia expansion for final chilling has been found necessary and progress has been made in determining the chilling rates that give the best crystallization of wax. Economies have been introduced into this method in the form of heat exchange that have aided in keeping the refrigerating requirements at a minimum. Press room temperatures have also been lowered in order to prevent an increase in temperature of the stock being dewaxed and the resulting redissolving of wax that had been precipitated at the lower temperature.

The dewaxing of bright stock-naphtha solutions by centrifuging is substantially the same procedure that has been used during the past few years with the exception that operating temperatures have been reduced as low as —40 F. in order to secure a bright stock having a 5 F. pour point. In this case economies have also been effected by the use of heat exchange and final chilling is also necessarily carried out by the direct expansion of ammonia.

The percentage of solvent naphtha used is ordinarily 60 per cent and the naphtha is of a rather narrow boiling range. The naphtha serves two purposes, in that in addition to accentuating the difference in molecular weight between the wax and dissolved bright stock, which is essential in order to obtain complete separation, it acts as a selective solvent for the bright stock.

Because of the higher solubility of bright stock in naphtha than of wax in naphtha there is a greater difference between the molecular weight of the bright stock-naphtha solution and the wax-naphtha solution. Because of the larger amount of heat to be extracted from the bright stock solution to be centrifuged in the production of wax free bright stock and the high operating vacuums of the refrigerating system the overall efficiency is low. This results in increased operating and overhead expense that is in reality out of proportion to the results obtained.

Use of Weir Process and Special Solvents

The other two methods referred to were dewaxing by the use of filter aids and solvents. There are mechanical difficulties to be overcome before either process is used extensively and neither is being used to any great extent at the present time. The Weir filter aid process may be used for dewaxing bright stocks and has one advantage over centrifuging in that the process is simpler. The stock in this case must also be diluted with naphtha and from one half to one pound per gallon of filter aid material is required. It has been found necessary in experimental work to dilute the bright stock with as high as 75 per cent naphtha and maintain a 30 F. differential between the filter temperature and pour point desired. There are mechanical difficulties in operation such as recovery of filter aid and naphtha. However, the naphtha loss does not greatly exceed the loss in centrifuging.

The possibilities of wax extraction by the use of solvents has been appreciated for some time but the high cost of solvents and the possible handling losses has delayed the development of the process. However, inasmuch as the process can be carried out at temperatures considerably above the pour point of the oil desired, I am of the opinion that the mechanical difficulties involved in the development of the process can be readily overcome and wax free oils produced at costs substantially the same as those produced by other processes.

In discussing the trend of manufacture of lubricating oils the manufacture of lubricants from mixed base crudes cannot be overlooked. The production of lubricants is now receiving considerable attention by refiners in the Mid-Continent and products now being manufactured from such crudes can equal lubricants made from Pennsylvania oil by selecting a crude that has a high paraffin content.

Vacuum Still Separates Asphalt From Lube Fractions

Such crudes as Seminole and Oklahoma City have a low per cent of asphalt but yet too high to make bright stocks by the usual method without high acid sludge losses during treating. This difficulty has been largely overcome by the use of vacuum distilling equipment which is capable of taking the steam refined stock overhead. In this way a separation is made between the asphalt and lubricating stocks.

In order to accomplish the most in this type of distillation, the problems involved must be carefully considered. Most of these units involve the use of pipe stills with high liquid velocity through the tubes and short time heating. The hot oil and vapors are discharged into a fractionating column operating at reduced pressures. The vapors are fractionated in the usual manner into gas oil, pressable wax distillate, slop wax and steam refined stock. The steam refined stock is then diluted, and centrifuged for wax extraction. This material must then be acid treated and filtered and the use of mechanical mixers and centrifugal separation of the acid sludge have aided materially in improving the product. Neutralization is usually accomplished by contact filtering.

By the further perfected use of the above process high quality bright stocks can be produced from the relatively low priced mixed base crudes and such oil will become a competitor in the field now enjoyed only by Pennsylvania stocks.

Now a BALL BEARING Swing Joint

CROSS-SECTION VIEW OF ELBOW SHOWING ITS INTERNAL CONSTRUCTION WITH NIPPLE AND PACKING NUT COMPLETE
WALL OF ELBOW
CHANNEL THROUGH WHICH BALLS ARE INSERTED IN RACE
PACKING
PACKING SEAT
UPPER END OF NIPPLE SHOWING BALL RACE WITH BALLS WHICH HOLD CONNECTION DURING RENEWAL OF PACKING
PACKING NUT
NIPPLE

Pat. Appl'd For

BALLS HOLD CONNECTION WHILE PACKING IS RENEWED

THE cross-section view above shows how this new Swing Joint is made. Observe the upper end of the nipple with its ball race and its flared packing seat. Note that the elbow rides on the balls which hold the connection in place when the packing nut is unscrewed and slipped down on the nipple for repacking.

This new Wheaton Ball Bearing Swing Joint marks a tremendous advance in design. It makes repacking an easy one-man job—without blocking up the pipe line or taking the risk of the pipe falling. And it is the last word in easy swinging.

Send for a sample. If not entirely satisfactory, return it for full credit or refund.

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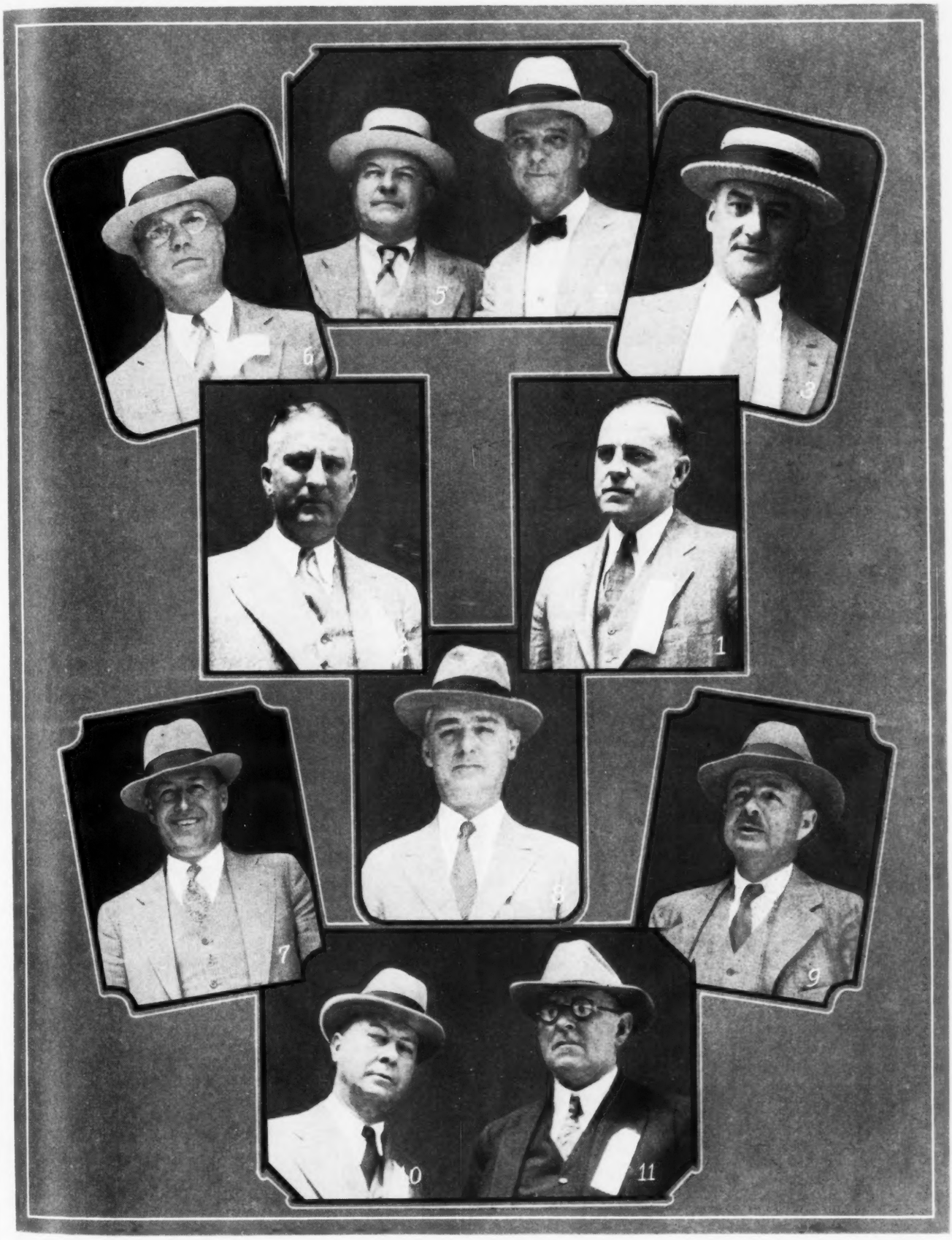
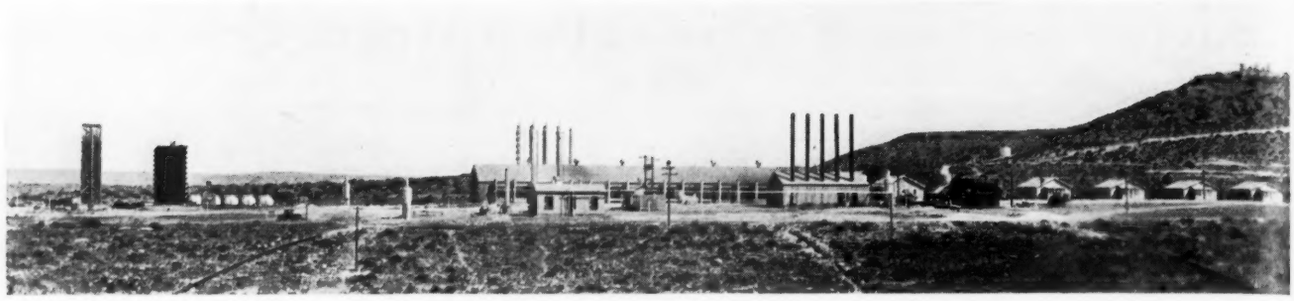
Independent Producers at Fort Worth Convention



1, *Dudley C. Monk, secretary and* 2, *James G. Cloud, chairman of the Tulsa tariff committee of the association;* 3, *Walter K. Campbell, Wichita Falls;* 4, *Marrs McLean, Beaumont;* 5, *John A. Deering, Houston;* 6, *W. M. Valerius, Tulsa;* 7, *R. J. St. Germain, Tulsa;* 8, *James H. Gardner, Tulsa;* 9, *W. D. Hamilton, Tulsa;* 10, *Lawrence (Bull) Heydrick, and* 11, *B. F. Caldwell, Wichita Falls*



Yates field natural gasoline plant of the Humble Oil & Refining Co.

Operators Squeeze Yates Structure For Maximum Ultimate Yields

By Paul Wagner
N. P. N. STAFF WRITER

LIKE the packers, who are reputed to get everything from the hog but the squeal, Yates field operators are making the most of their oil producing opportunities.

They are maintaining reservoir pressures under choked production practice; avoiding underground waste by means of minimum withdrawals that discourage water encroachments; utilizing the gas found in the top of the 20,000-acre structure for natural gasoline recovery; and in every way possible conducting operations so as to bring about maximum ultimate yields of crude.

The field, which from its inception has been prorated at less than three per cent of its maximum potential production of crude oil, is at present exploited at 110,000 barrels daily. At no time in the field's history has the withdrawal totalled more than 130,000 barrels daily. Its maximum potential, based on daily ratings reached by multiplying hourly test gauges of wells by 24, stands at the astounding total of 5,342,300 barrels, as shown by the figures of Ray W. Richmond, umpire.

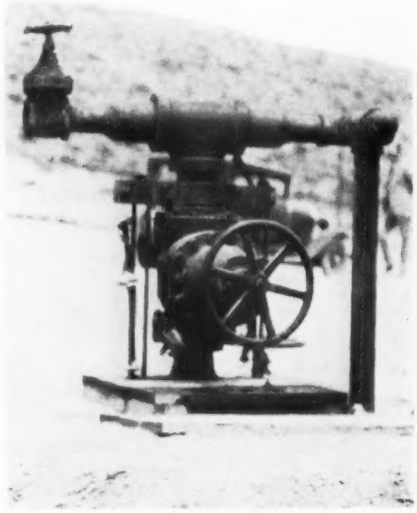
In the prorating yardstick, the field's potential is carried on a 12-hour basis, or 2,671,150 barrels, it being recognized that the maximum gauges indicated must be discounted to reach a figure more nearly representative of what the area could make under open flow exploitation, were this practicable or desirable.

That no actual figure will ever be obtained on the field's one-day producing capabilities is certain. Operators, who have co-operated fully in making Yates an ideal development, would not think of opening their wells (in a natural water drive field) to an extent that would encourage encroachment from the hydrostatic table backing up the oil on the flanks of the structure.

Engineers are agreed that encroachment might be encouraged by exploitation at levels as low as 500,000 barrels daily, hence the feeling that no matter what the crude market demand of the future the field may never be opened at a higher level than that mentioned, if indeed that mark is ever reached.

Ray W. Richmond, as proration umpire, has estimated that production in the Yates proved area will last approximately 14 years longer at the present rate of withdrawals. That would give the field, which has already produced approximately 10 per cent of its estimated ultimate recovery, a total final yield of roundly 700,000,000 barrels.

The field's phenomenal character may be mentioned again here as contributing to a rounded-out discussion of its many-sided features. Most of the wells, producing from depths of 990 to 1650 feet, according to surface elevations, were drilled with portable machines and few derricks stand as completion sites.



Mid-Kansas and Transcontinental A-30 well in Yates field which, on hourly gage, tested at the rate of 204,000 barrels daily

A visitor to the field sees, in addition to the interesting topography, only the camp sites of operating companies and flow-tank batteries erected at individual wells. This condition prevails throughout an area seven miles long, northwest-southeast along the strike of the Yates structure, and seven miles east-west at the widest point in the field.

The only large tanks in the field are those erected for pipeline working facilities, as Yates practice has been to balance withdrawals with crude demand; thereby preventing losses through corrosive action of sulfur crude or hydrogen sulfide gas on tankage, thus minimizing actual or economic waste generally.

In discussing the maximum potential production of the field, placed at 5,342,300 barrels, Umpire Richmond points out that the present exploitation of 110,000 barrels daily represents approximately 2.85 per cent of the potential. There are now 368 producing wells with average potential production of 14,517 barrels daily and actual withdrawals of but 299 barrels per well daily.

A single well in the field, A-30 of the Mid-Kansas Oil & Gas Co., and the Transcontinental Oil Co. partnership, tested in one-hour at the rate of 204,000 barrels daily through 10-inch casing, with which the hole is bottomed. Its potential production alone represents nearly double the present daily exploitation of the field.

The A-30 well was drilled adjacent to another of the Mid-Kansas & Transcontinental partnership, which it had been feared influenced the presence of seepage oil on the east side of the Yates structure, where important recoveries of crude have been gained from the operation of surface pits.

Whether such an influence actually

existed or not, may never be known, but its owners took no chances on damaging future recoveries; killing the first well by cementing to bottom and drilling another hole in its stead.

Seepage oil first appeared on the west bank of the Pecos river, Oct. 28, 1928, two years to a day after the Yates field discovery was drilled. Later, developments showed this seepage oil could be recovered in commercial quantities, though at first it was regarded as of little importance.

The Haws interests, who at that time operated a Pecos river bed lease, made preparations to salvage the seepage oil by digging ditches along the banks of the river and trapping the crude in pits. The seepage oil was at first thought to have originated from surface waste accumulations in the vicinity, but the theory was later abandoned when the supply increased materially.

Continental Oil Co., (then the Marland Production Co.) and the Mid-Kansas-Transcontinental partnership soon took protective measures to recover seepage oil on their leases adjoining the river bed on the west.

Up to April 15, 1930, seepage recoveries from a loosely cemented gravel horizon had produced from pits and shallow wells a total of 2,120,536 barrels of pipeline oil divided as between three companies as follows:

Riverbed lease of the Haws interests and the Grayburg Oil Co., 278,335 barrels; Continental (Marland) Oil Co., Yates lease, 1,664, 548 barrels; Mid-Kansas & Transcontinental's "B" and "C" leases, 177,653 barrels.

Oil recovered from seepage sources has reached as high as 10,500 barrels daily and at present averages 3268 barrels daily. Of the total recovery for the first half of April this year, Continental Oil Co's. runs averaged 3017 daily; Grayburg Oil Co., 165 barrels; and the Mid-Kansas & Transcontinental partnership 86 barrels.

Ray W. Richmond, Yates field umpire

In the early stages of Yates development shallow wells and pits were placed under prorating restrictions common to other wells in the field; however, in November, 1928, the Railroad Commission of Texas gave a decision on curtailment of this production whereby proration limitations were lifted. The decision came as a result of a study of conditions by the fish and oyster commission, which has jurisdiction over Texas streams, plus work of the railroad commission on the problem of stopping influx of oil into the river.

From a conservation standpoint, it was ruled that the seepage oil should not come under regulations affecting prorating practice. Companies producing or recovering the seepage oil then were allowed to run all such crude as they were capable of getting. It was generally felt it would be best to recover and deplete the seepage supply as fast as possible. At present no oil is finding its way into the river.

One of the latest steps taken to conserve reservoir pressures and gain a maximum efficiency in Yates producing practice has been the building and operating of a natural gasoline plant in the field by Humble Oil & Refining Co. The plant was put in operation early in 1929 and is being handled with the end in view of bringing about an ideal balance in the oil/gas ratio.

The Humble's gasoline plant now utilizes 24,000,000 cubic feet of gas daily from properties of the various companies operating in the Yates field. Excess gas production above the level mentioned is allowed to be burned in flares as its hydrogen sulfide character makes it dangerous otherwise and a source of possible waste when unutilized. It is hoped to so control the gas supply by co-operative work that none will be popped off into the air and that no part of the supply may be wasted in any manner.

Some Yates field wells show as low ratios as 46 cubic feet of gas to the barrel of oil and any number connected to the Humble's plant test 80 cubic feet to the barrel. In a test completed early in the year on the 97 wells then connected to the Humble plant it was shown that the average ratio was 337 cubic feet to the barrel and it was believed the ratio could be lowered to 200/1 eventually.

Mr. Richmond is authority for the statement that the solubility of gas in Yates crude approximates 146 cubic feet to the barrel of oil testing 30.1 gravity of 86 degrees temperature.

Tests to show gasoline content of Yates gas have indicated to Mr. Richmond that the holding of 80 pounds pressure on the gas trap will give a yield of .46 gallon to the thousand cubic feet of gas, but that by reducing the pressure on the same trap a yield of 1.52 gallons per thousand may be obtained.

A seepage oil pit along Pecos river, east side of Yates field

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Initials of Two New Konawa Wells Top Total for Whole Pool

By William F. Lowe
N. P. N. STAFF WRITER

TULSA, April 26

MID-CONTINENT production news of the past week has been split up between freak wells, new producers and first reports. The most spectacular developments were in Oklahoma where the Konawa pool of southern Seminole county got two new ones of major proportions. The comparatively new south Earlsboro pool had its largest producer while the West Chandler lost one of its best oilers over night.

At Oklahoma City, the bailing in of three big sand wells in the north end of the field brought a flock of first reports to the town-lot territory. All of these new locations read in odd foot measurements and it looks as if it might be real neighborly up there before long.

In Garfield county, the wildcat of the Continental Oil Co., picked up a new pay in the Simpson and trebles the production it had found the previous week. The well is now estimated at nearly 700 barrels, which is a good showing for a wildcat though it would be considered practically a dry hole in the "City" pool.

The Texas Panhandle had three good completions in Gray county and the new discovery in northeastern Moore county responded to swabbing with increased daily yield. A pool is in the embryonic stage in the latter area as several wells are starting and a new oil town is beginning to bloom. A Siliceous lime failure in Edwards county and 10 first reports in the gas territory of Morton and Stephens counties were the outstanding events in Kansas.

As if to prove that at least one U. S. Senator had been living right, the W. B. Pine No. 1 Charty, NE NW SW, 16-6-6E, on the south end of the main Konawa pool in Seminole county, Okla., made 3492 barrels in 12 hours. The pay, found from 2861 to 2874, seems to be the Gilcrease sand. On the north end of the recent south extension of the same area, the Twin-State Oil Co., made a 4600 barrel producer out of its No. 2 Charlie SW NE NE, 20-6-6E. This well is bottomed at 2962 in a sand, that, being a little lower than that of the Pine well, may be the Cromwell. There seems to be a question about the differentiation between the two pays of the wells though they will probably develop the same tricky characteristics later on.

The relative positions of these new producers is shown on the accompanying map. Both are extensions of their own areas, but when the erratic history of the Konawa pool is considered, neither has any particular significance beyond their spectacular initials. The area has been marked with inconsistencies since it was first discovered and operators could never feel even reasonably sure of production when starting a well. A glance at the map shows the generous distribution of dry holes over the whole pool and these do not begin to tell the water story. Production declines rapidly in some wells and holds up fairly well in others. The present daily average for the whole pool is a little less than 8000 barrels which is less than the total of the two new wells.

In the same county, the south Earlsboro pool had its largest producer in the Amerada-Dixie No. 2 Grounds in 23-9-5E. The average initial for this southern extension to the old Earlsboro pool is about 1800 barrels but the new one, bottomed in the Wilcox at 4234 feet made 5340 barrels the first 24 hours. It looks as if there was lots of room for good ones yet in the greater Seminole area.

Lincoln county had a little excitement in the West Chandler pool when one of its new big ones died suddenly. This well, the No. 2 Decker, SW SE 8-14-4E, of the Magnolia Petroleum Co., was making over 2000 barrels a day from what is thought to be the Hunton lime at 4675 T. D. Its recent unusual initial had been the cause of several offsets but its quick demise suggested the possibility of an exhausted stray sand and the well was rigged to deepen. The trouble however, proved to be nothing but a bridge and when this was removed the well started flowing at the rate of 200 barrels an hour.

A little over a mile west, the No. 2 Benedict of the same company, in NE SW NW, 7-14-4E, was opened wide for the first time and gauged 3485 barrels in 24 hours. The well is producing from the Siliceous lime at a total depth of 5077 and, being a comparatively new well, it too has been the inspiration for a number of offsets.

Oklahoma City's latest outburst, which resulted in a short extension to the north, started the complications in the town-lot end of the pool. All three of the new sand producers are in the southwest of 1-11-3W and only one is a regular location. Two belonged to T. B. Slick and had initials of 14,946 and 16,040 respectively and the third was the No. 1 Dunn of the Skelly Oil Co., which is rated above 18,000 barrels.

These wells are in an addition just

Voshell Pool Allowance Revised Upward

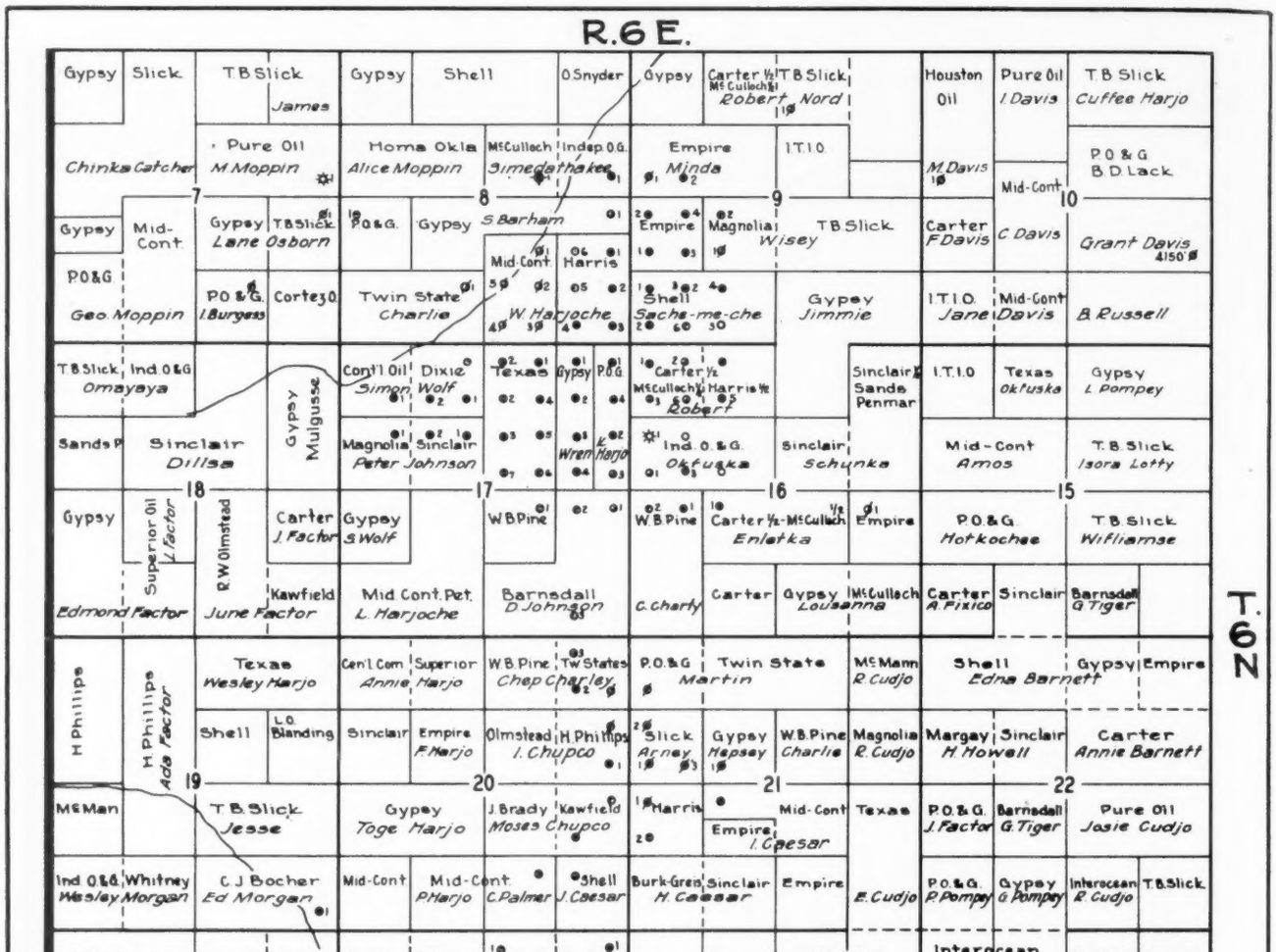
TULSA, April 26.—The deepening of the wells in the Voshell pool of McPherson county, Kansas, to the Siliceous lime, has made the potential figure for the pool jump up to almost three times the allowed production under the present proration program. The result has been that the operators agreed to increase the limit from 19,000 barrels to 22,000 barrels per day. The major features of the new plan are as follows:

Potentials of old wells are to be taken from pumping records of the individual wells. These will be taken every 15 days beginning with May 1. New wells are to be allowed a 72-hour period for cleaning out and establishing a swabbing potential, after which they will be allowed a 12-day swabbing period in order that they may have some of the advantages of flush production.

The pool production limit is to be determined by the pipeline capacities. At the present time this is 19,000 barrels, but the Skelly Oil Co., announced that it is to enter the field with a new 4-inch line to loading rack thereby increasing the total outlet to 22,000 barrels. This plan is to be in force until June 15.

T. C. Johnson, Kansas proration umpire estimated the present potential of the pool to be in excess of 60,000 barrels from 44 regular producers. During the past week 22 new wells were completed to the big lime pay and these wells had an average initial of 1392 barrels. Most of the producers are in the Siliceous lime though eight are thought to be getting their oil from the Wilcox.

Pipelines already in the pool are those of the Shell, Prairie and Derby.



Map of Konawa Pool of Seminole county, Okla., showing development to date and the relative locations of the Pine and Twin-State wells brought in this week. The former is in NE NW SW, 16-6-6E and the latter SW NE NE, 20-6-6E

outside of the city limits but the new locations, that were made as a result of their completions, are crossing the municipal line. The area being entered is fairly well built up and the city dads are laying down some rules of conduct both for leases and for drilling.

The Oklahoma City pool averaged 99,600 barrels a day during the past week with a one day peak of 146,795 barrels from 50 producers. There are 206 wells on the waiting list for proration and very few of them will make less than 10,000 barrels per day. No increase is to be made in the proration rate until May 9.

In Garfield county the wildcat of the Continental Oil Co., continued in the current news by finding an increase in the Siliceous lime. The original pay was from 5906 to 5812 and was good for about 200 barrels a day. Drilling ahead, another was found from 5938 to 5942 and the production jumped to nearly 700 barrels. Water was encountered at a total depth of 5973 and the well was plugged back to 5960 where it will be produced. The well is important in that it proves the possibilities between the old Garber pool and those of Logan county.

Gray county of the Texas Panhandle had three good ones in the territory just north of the Finley pool. The Phillips Petroleum Co., No. 2 Woods, 13, Blk 3, I&GN, started off as a 3000-barrel producer and its No. 1 Fox, 36, Blk. 3, I&GN, made 60 barrels an hour initially with 40,000,000 gas. The pays were in lime at 2850 and 2870 feet respectively. The Wilcox Oil & Gas Co., No. 13 Coombs, 37, Blk. 3, made 3654 barrels.

Hutchinson county now has a new pay in the Cheatham area near the town of Pantex. The Dixon Creek Oil Co., drilling deeper in its No. 7 Cheatham-Johnson, found a lime pay from 3604 to 3671 and started producing at the rate of 40 barrels an hour. Thirteen wells are drilling in this territory and more are likely to follow in the near future as many of the leases are due to expire before the end of the year. Most of this area was formerly considered just good gas acreage but in the last year some of the county's best wells have been found in the neighborhood.

ONE day in the life of a news writer in Tulsa. 8:30 a.m.—Arrives at office (home office please note) and finds visitor with hot rumor that Prairie and Sinclair merger will be announced within three days. Gets Prairie executives at Independence on phone and learns that they have never heard of Sinclair company.

8:45 a.m.—Starts out to make rounds of information centers and is stopped at first one with report that Phillips, Skelly, Independent, Barnsdall, Mid-Continent officials have been checking each other's properties with view to merger. Hotfoots it back to office to run the matter to earth. Telephone calls reveal that Messrs. Skelly, Frank and Waite Phillips, E. B. Reeser and Jacob France have been seen in New York hotel on the same day. Suspicion becomes certainty. Starts down street and meets Messrs. Skelly, Reeser and Waite Phillips all within five minutes. Later learns that they really had been seen in New York at same time but that it was four months earlier during an A.P.I. directors meeting.

9:10 a.m.—From "inside" source learns that Dixie Oil Co. is dealing on behalf of Standard of Indiana for purchase of Amerada and Skelly. Calls on President Frank Prior, of the Dixie, for confirmation and hears only a slightly funny story about a traveling man.

10:00 a.m.—Cousin of former bookkeeper for Carter Oil Co. relates red-hot report that Standard of New Jersey will advance crude oil price tomorrow, due to heavy demand in Nova Zembla. President Dick Yourg denies that he ever heard of Nova Zembla.

11-12:00 noon.—Spends hour writing out article merging everything he can think of.

1:00 p.m.—Returns from lunch (home office, note again) and tears up article after learning from waiter that no merger now rumored has a chance of succeeding.

2:00 p.m.—Gets report that Deep Rock Oil has bought control of Prairie Pipe Line Co. Calls President Gates at Independence and learns that Prairie Pipe sells out only on Tuesdays and never on Wednesdays and here it is Thursday.

3:00 p.m.—Sinclair-Prairie merger on again.

3:10 p.m.—Sinclair-Prairie merger definitely off.

4:00 p.m.—Gets report that Shell executive was seen looking at Gypsy lease, doubtless for purpose of Gulf-Shell merger. Investigates and finds that Shell man had confused it with Continental lease, which starts brand new rumor.

5:00 p.m.—Leaves office for home after writing memo to self to get in touch next morning with officials of Prairie, Sinclair, Skelly, Phillips, Barnsdall, Mid-Continent, Independent and several others to discuss merger reports.

* * *

For the present the headquarters of the Independent Petroleum Association of America will remain in Ardmore. Russell B. Brown, Ardmore attorney, has been appointed executive manager. Mr. Brown was closely identified with the Washington campaign for an oil tariff. He directed the office work there and shared with Wirt Franklin the displeasure of Senator Blaine when the latter was gunning for "oil millionaires" suspected of having disturbed the probity of the Senate. There is still some bidding for the permanent headquarters of the association. Tulsa, Oklahoma City and Fort Worth all have their lightning rods up.

—Photo by Harris & Ewing

Russell B. Brown

The Independent Petroleum Association of Texas, a division of the I.P.A.A., has announced its selection of a full time secretary. Claude C. Wild is the man. He is an attorney, formerly located in Cisco, and comes to the association from the San Angelo board of city development of which he was secretary-manager. He will maintain offices in Fort Worth.

* * *

Married: Miss Prebble Price and Carter Porter. Mr. Porter is superintendent of the southern division of the Blackwell Oil & Gas Co.

* * *

C. E. Crawley, vice-president of the Sinclair Consolidated Oil Corp., paid his first visit of 1930 to the Tulsa offices last week.

* * *

Despite the imposing showing that is being made in a nation wide poll by those who desire repeal of the 18th amendment, Edwin I. Reeser, of the Barnsdall Corp. says the saloon cannot be brought back. Every good location, he told Kansas jobbers, is now occupied by a filling station.

* * *

Annoyed, no doubt, by the several kinds of hazards on the usual golf course, Lynn C. Converse, head of a Tulsa insulation engineering company, is constructing his own links on his estate near Jenks, Okla. We hear he is arranging one that will have no rough at all.

* * *

Arthur W. Ambrose, of Bartlesville, has been elected a vice-president of the Empire Oil & Refining Co. Formerly he had the title of manager of the oil production division of the company, under which were grouped also the geological and land department. "Pete" was with the Bureau of Mines for several years and was the chief petroleum technologist thereof when he resigned in 1923 to join the Empire.

* * *

The oil industry, says Ellick Botts, consulting pumper of the Gray Horse district, is slowly returning to normal form. The Dubbs people have filed four new lawsuits, after a lapse of several months.

* * *

Someone, to test the truth of the theory that Standard companies al-

New Operating Methods

An average of two articles per issue of National Petroleum News, have discussed new operating methods and solutions to problems facing operators in the oil fields.

What operators are doing to cut costs, new methods and ingenious devices for more efficient work, and other features, are told in these articles.

Here are 70 that have appeared since July, 1929 for your file reference:

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Do's and don'ts in oil well shooting Apr. 9, p. 62
Shaft-driven hydraulic rotary starts first hole in Mid-Continent March 26, p. 67
Crookedness of California wells cut 50% in 1929 March 26, p. 53
Handling high pressures at Oklahoma City March 19, p. 88
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Wyoming operators to use one stratum at a time Feb. 19, p. 43
Open flow tests show lower potentials in Santa Fe Springs Feb. 19, p. 44
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Oklahoma City pool has peculiar operating problems July 3, p. 36

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National Petroleum News

Main Office: 1213 West Third St. ***Cleveland, Ohio***

ways conceal their wildcat oil discoveries, dynamited the connections on a Magnolia Petroleum Co. well 18 miles northeast of Duncan, Okla., recently. The well was completed years ago as a gasser and has been shut in, lacking market. Other tests in the vicinity were dry. The blast merely enhanced the company's reputation for veracity.

* * *

Clarence L. Sutton, formerly production superintendent for the American Maracaibo Co. at Fort Worth, has joined, in the same capacity, the Oklahoma Co., under which name R. H. Smith, of Philadelphia has grouped his own holdings and the McCulloch Oil Co., Marquette Oil Co. and others.

* * *

Harry H. Hill, vice president of the Standard Oil Development Co., the research subsidiary of the New Jersey company, spent a week in the Mid-Continent conferring with engineers of the Carter Oil Co. Mr. Hill formerly was chief petroleum engineer of the Bureau of Mines.

* * *

There may have been one or two earlier, but our records show the first straw hat of the 1930 season to have been worn publicly by Jesse H. Hill chief of The Texas Co. legal department in the Mid-Continent. It happened on or about April 10.

* * *

Comar Oil Co. employes at Tonkawa felt so good about the record of safety they have set up that they celebrated with a barbeque at which some 2000 were present. The record was one million man-hours without lost-time accident, over a period of one and a half years and involving more than 300 employes.

* * *

News of the Geologists: K. H. de Cousser is a new member of the Prairie Oil & Gas Co.'s geological department in Tulsa. . . . Richard L. Triplett, formerly of the Gypsy Oil Co., has been transferred to the Western Gulf Oil Co., Los Angeles. . . . Forest R. Rees is now chief geologist of the Peters Petroleum Corp., Tulsa . . . A. A. Langworthy, chief geologist of the Pure Oil Co.'s southwest producing division, is back at work after a long illness . . . .T. K. Harnsberger, of the Shell Petroleum Corp., is another who was on "sick call" and is now marked "duty."

* * *

"I beg to offer my advice," writes J. S. K., of New York, "as to how to stop a singing stenographer, which is referred to on page 50 of the April 9th issue of NATIONAL PETROLEUM NEWS. "I suggest you take away her 'notes.'"

Ah, but she still has her key.

* * *

Independent Oil & Gas Co. has opened a land and geological office in Oklahoma City. William Vaughey is the land man; Harry L. Baldwin and J. L. Meyers are geologists and Lee Phillips is scout.

Laying a 14" Naylor Pipe line in uniform 40 foot lengths.

Saving $506.88 Per Mile In Laying Costs ....With Naylor Pipe

THIS saving was made by a large oil company on a 12" Naylor Pipe line, Victaulic coupled. The laying costs of the whole line totalled only $100.32 per mile.

A similar 12" line of standard weight pipe, 18 to 22 foot random lengths, had cost this same company $607.20 per mile to lay. *$506.88 more than Naylor Pipe had cost them.*

Naylor Pipe assures lower laying costs because of its light weight. It weighs one half as much as standard weight wrought pipe. Light weight pipe speeds up laying because it is so much easier to handle in the field. And ease of handling requires fewer men on the job. Less labor means lower costs.

As to the other economies of Naylor Pipe: When the total costs on the two lines were finally compared (from freight to "as laid in the ground") the results *showed a net saving of $2064.74 per mile on Naylor Pipe.*

The light weight of Naylor Pipe which is responsible for these economies is due to a spiralwelded lock-seam truss which provides maximum structural strength with minimum weight.

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Naylor Pipe

Maximum Structural Strength — Mo-lyb-den-um — With Minimum Weight

IRON

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Deep Test in North Belridge Field Fails to Obtain Commercial Oil

By Jack N. Westsmith
N. P. N. STAFF WRITER

LOS ANGELES, April 25

A DISAPPOINTING production test in the San Joaquin Valley, another completion in the coastal tidelands, and interesting showings in important wildcats and proven areas at several points in the state, claimed the attention of operators on the Pacific Coast during the past calendar week.

Although the much talked of production test of Belridge Oil Co.'s deep project on the northeast flank of the North Belridge field failed to obtain commercial production, operators are still optimistic over the possibilities of this well, and its surrounding acreage.

In the opinion of some experts, the well was completed in a very unsatisfactory manner. They claim that the resulting production of approximately 10 million cubic feet of natural gas and a trace of 35 to 45 gravity oil was not at all indicative of what the Temblor sands in this area are capable of yielding.

For three days prior to swabbing the well in, a heavy charge of hematite was circulated in an effort to retain control of the existing heavy gas pressure. This charge of heavily laden mud is thought to have acted as a clog to the oil and gas flow, for, when initially completed the well made only 5 or 6 million cubic feet of gas and less than a trace of oil. After flowing through four 1½-inch beans for several hours an improvement was noted in the rate of output and operators present at the test reported the area still looks good.

California companies holding acreage in the main Belridge field, to the south, and in the Lost Hills field, to the east of this deep test are reported to be making preparations for additional tests of the Temblor horizon in the northern end of the San Joaquin Valley.

In line with this exploitation of the upper "Valley" areas, Richfield Oil Co. is reported preparing to start a deep test of its holdings in the Kreyenhagen Hills, Fresno county, south of the Kettleman Hills.

According to current field reports, the test is to be located on Sec. 33, 22-16 and will be drilled to at least 6000 feet, to give this particular district its first thorough examination. Two shallow holes were drilled on the property with cable tools, but Richfield will use equipment similar in size and strength to that employed in drilling the hard formations at Kettleman Hills.

After a delay of several weeks during which the well was suspended in the oil sands, Standard Oil Co. completed its No. 38 on Sec. 35, north dome of Kettleman Hills offsetting Petroleum Securities Felix 1, for an initial production of approximately 2100 barrels of 60 gravity oil.

Notwithstanding the expressed opinions of some experts that since Sec. 35 is down structure from the discovery well and the consequent life of such wells as are drilled in that area will be comparatively short lived, the fact still remains that Continental Oil Co. should be drilling on its government permit land offsetting Sec. 35, which is held in fee.

In addition to the two present producers on Sec. 35, Felix No. 1 and No. 38, Associated Oil Co. may be expected to complete its Whepley No. 1, further down structure on the same section, within two or three weeks, baring mechanical difficulties. With three active producers in this area Continental's chances of obtaining any large quantity of oil from its permit holdings are considered to be growing every minute.

It is reported Dr. George Otis Smith, chief United States Geological Survey and general investigator for the Department of the Interior, is on his way to California presumably to look into the Kettleman Hills situation.

IN THE ordinary course of events Continental will have to hold its drilling operations, on offsets to these three wells on Sec. 35, in abeyance until after July 31, 1931. This in accordance with provisions of the Kettleman Hills conservation agreement entered into by holders of permit land on the north dome of the Kettleman Hills at the request of the Secretary of the Interior.

Modification of this agreement would be extremely difficult to make equitable and still not permit a wholesale exploitation of the entire north dome because, like a rock thrown into a pool of water, any lifting of the lid on drilling activities in one portion of the field would have its effect on other portions.

In sharp contrast to this more or less inequitable condition in what is considered California's most promising field, there is the more orderly and complete development under way in the Coastal field of Elwood.

Elwood Exploration Co., subsidiary of Honolulu Consolidated Oil Co., obtained its second tideland producer in that area early in the week by successfully completing its No. 90-2 for an initial production of 4000 barrels of oil from a depth of 3496 feet. Casing and tubing pressures built up soon after the completion and although results of the five-day flow test are not compiled it is expected the well will follow other tideland completions by increasing its daily output during this period of unrestricted flow.

TWO other wells in this area, one by the Barnsdall-Rio Grande interests and the other by Pacific Western Oil Co., are drilling in the pay sand and may be expected to be on production within a week or ten days. Exclusive of this most recent completion, Elwood had a potential production of 86,261 barrels per day, and an allowable daily yield of 46,077 barrels. Including the new well, production as of April 23 was approximately 50,000 barrels.

Completion of Associated Oil Co.'s Lloyd No. 97 at Ventura Avenue for 5180 barrels of 27.3 gravity oil and 5 million cubic feet of gas from a depth of 7193 feet boosted the field's actual daily production to 49,000 barrels. Exclusive of this new completion the field has a potential and allowable production of 74,447 and 43,005 barrels respectively, or considerably less than similar figures for Elwood.

A much more doubtful but nevertheless interesting drilling program is reported in preparation at Huntington Beach, Los Angeles, county.

Meager field reports indicate that very little is known of actual showing in Barnsdall Oil Co.'s deep test of "the Beach" field, but other companies operating in the area have taken considerable protective acreage on the strength of these reports.

Official reports are to the effect that so far only slight oil and gas showings have been obtained and that, while it is believed a deep sand in the Miocene formation underlies the shal-

low zones, present showings are far from conclusive.

A wildcat being drilled by the Marcell Petroleum Co., on Sec. 31, 2-8, San Bernardino county in the Anaheim quadrangle, is reported to have cored approximately 18 feet of fair looking oil sands at a depth of 1698 feet.

Another and perhaps more important strike was reported by Chanslor Canfield Midway Oil Co. in its Hobson A-2 drilling at 6856 feet. The project, which is located approximately two miles southeast of the coastal field of Rincon, obtained a water shutoff at 6673 feet and production test will be made of its present penetration within the coming week.

On the Western Front

By Jack N. Westsmith
Los Angeles

TO OBTAIN better cooperation and to facilitate operation in California oil industry's voluntary curtailment program, Paul Boggs, chairman of the State-Wide Committee appointed the following committee of 11 men: Hooper C. Dunbar, Bell View Oil Co.; C. R. McCullom, Pacific Western Oil Co.; S. B. Mosher, Signal Oil and Gas Co.; L. M. Lockhart, Rio Grande Oil Co.; Allen Jergins, Jergins Synd.; T. E. Swigert, Shell Oil Co., R. E. Haylet, Union Oil Co.; W. E. Dunlap, Richfield Oil Co.; Earl W. Wagy, Standard Oil Co.; A. S. "Doc" Hays, General Petroleum Corp. and Ralph Lloyd, Ventura Avenue royalty owner.

This group will meet and select an economist to help outline the important features to be covered by the survey.

* * *

J. A. Bermingham, vice president and manager of the production department of The Texas Co., in California, left Los Angeles, April 24 for Tulsa, where he will meet other members of his company for the purpose of making an inspection tour of the company's properties in the Mid-Continent and Texas fields.

Although Mr. Bermingham is a great advocate of air travel he decided to stick to the ground on this trip so as to check points of interest along the way.

* * *

George F. Getty, partner with his son J. Paul Getty in George F. Getty Inc. one of the larger independents operating at Santa Fe Springs, is reported critically ill and under the care of his physician. Paul Getty, who has been making a tour of Europe, is on his way back to his father's bedside.

* * *

Joseph M. Regan, president and general manager of the Regan Forge and Engineering Co. died suddenly April 18, from a heart ailment. Mr. Regan, as general manager of his company has been highly instrumental in developing the engineering profession as it applied to the oil industry.

In partnership with his brother James, Mr. Regan founded the forge and engineering company and has witnessed its growth from a small machine shop to one of the important oil well equipment manufacturing concerns on the Pacific Coast.

No announcement has been made as to who will succeed Mr. Regan as general manager of the company but it is expected business will be carried on under the management of officials of the company who assisted Mr. Regan in the past.

* * *

Herbert R. MacMillan, president of the California Oil and Gas Association and chairman of the Santa Fe Springs Operators' Committee left Los Angeles during the past week for Washington, D. C. where he is scheduled to deliver an address on "Curtailment in California" at the annual meeting of the United States Chamber of Commerce, April 28.

During Mr. MacMillan's absence and perhaps permanently, Hooper C. Dunbar, vice president, Bell View Oil Co., will act as chairman of the Santa Fe Springs committee.

Photo by Curtis Biltmore Studios L. A.

Lester H. Keim, vice president and general manager of the Oil Well Supply Co. recently elected as treasurer of the production division of the American Petroleum Institute, Pacific Coast section

* * *

A group of petroleum engineers from the graduating class of the Colorado School of Mines and two instructors, recently made an inspection tour of the California fields as guests of Jack Greenspoon, an aluminus of the school, and E. L. Demaris, a former classmate of George Fancher, one of the instructors.

Both Mr. Greenspoon and Mr. Demaris are in the geological department of General Petroleum Corp. and were able to include in the trip a visit to refineries of General Petroleum Corp., Shell Oil Co. and Union Oil Co., as well as a detailed tour of the principal oil fields in the Los Angeles Basin.

So as to have plenty to tell their classmates in Colorado, the boys took a few hours off from a study of the oil industry to get an eye full of Clara Bow doing her stuff on a Hollywood movie lot.

* * *

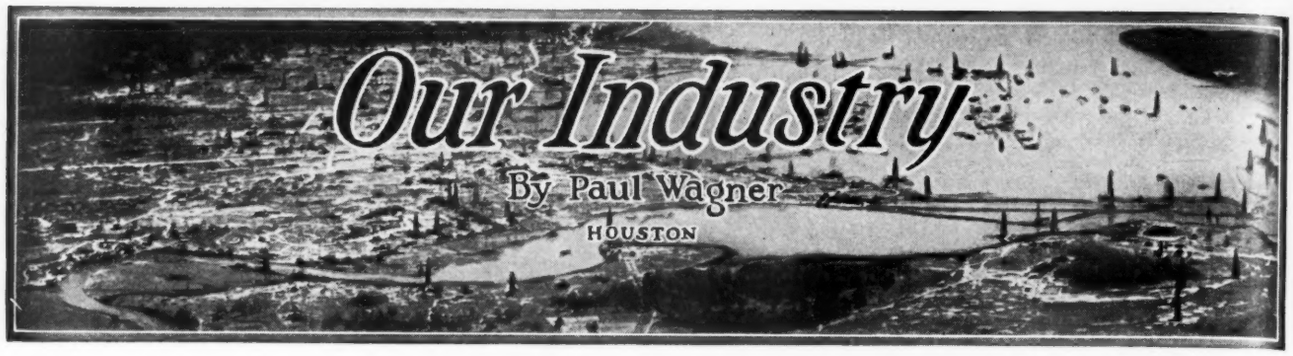
The Deep Well Tool Corp., Ltd. has been granted a permit to sell 50,000 shares of its stock at $10 a share, and immediate contruction is expected on a $150,000 plant at Wilmington, Cal. for the manufacturing and reconditioning of oil well drilling tools covered by patents owned by the company.

According to R. O. Pickin, president of the new organization, the company will specialize in the application of a diamond substitute to all types of drilling tools that cut with a scraping action.

Other officers of the new company are as follows: L. F. Vremsak, vice president, L. M. Lieberman, secretary-treasurer, and Floyd A. Wilson and Jules J. Covey, directors.

* * *

L. W. Rogers, engineer, who was formerly connected with various oil companies in Roumania and who recently joined the London staff of the National Supply Co., is in California where he will make a study of the operating conditions of local fields. He will visit other American fields and the factory and branches of the company before he returns to his headquarters.



JOHN G. (JACK) PEW of the Sun Oil Co.'s land department at Dallas is wearing smiles these days about the basketball championship won by his group of Sunoco Oilers. For the third consecutive year the Dallas players have won the national basketball championship. First, this year, the Sunoco Oilers won the city championship of Dallas, then the Southern A. A. U., and then the national contest at Wichita.

"Jack" Pew heads the Dallas Sunoco team, Louie Smith is business manager and Howard Allen is coach. All members of the team and its organization staff are identified with the Sun Oil Co., at its southwestern headquarters in Dallas.

* * *

C. E. Tabor is in charge of the Milham Exploration Co.'s operations on the Pacific Coast in the period of an extended leave of absence taken by Pat M. Longan, executive vice president at Los Angeles. Mr. Longan, a veteran of Tampico district development, where he represented the International Petroleum Co., another subsidiary of Mexican Seaboard Oil Co. of Maine, will spend several months recuperating from a recent illness.

C. P. Parsons

C. P. Parsons of the Halliburton Oil Well Cementing Co., Duncan, Okla., joined that organization nearly a year ago, after resigning from the Magnolia Petroleum Co., for which he was a field executive in the Mid-Continent territory. In addition to his other activities with the Hlliburton organization,, Mr. Parsons is editor of a house organ issued periodically.

* * *

U. S. Waugh is now office manager at Los Angeles of the California Petroleum Exchange in the Pacific Electric building. An old time Kern county operator in California he is widely known throughout the oil country after many years spent in Wyoming, Texas, and the Mid-Continent generally.

* * *

R. L. Wheelock, mayor of Corsicana and widely known in the oil business because of his part in Powell field development of Navarro county, Texas, is receiver for the Central Texas Refining Co., under orders issued by Judge Hawkins Scarborough. The receivership suit was brought by C. A. Middleton, principal in the Kent-Middleton Refining Co., out of which the Central Texas Refining Co. grew last year.

* * *

For consecutive re-elections as president of the Independent Oil Producers Agency of California, L. P. St. Clair of Los Angeles has set up a record that probably could not be duplicated in any other producing organization. At the 1930 annual meeting of the agency he was elected president for the 24th time. Mr. St. Clair is also executive vice president of the Union Oil Co. of California, which buys oil produced by agency members in the San Joaquin Valley region, under yearly contract. S. W. Morsehead was elected vice president at the 1930 meeting and W. B. Robb was again named secretary.

* * *

D. H. Thornburg is now Texas geologist for the Adams Royalty Co., maintaining offices at Dallas. He was formerly located at San Angelo, at one time with the Shell Petroleum Corp., and later with the Fuhrman Petroleum Co.

* * *

Charles H. Layne of the Thrift Corp., and the Hydraulic Engineering Co., has returned to Houston headquarters after a trip to the Pacific Coast that extended over a period of several weeks.

* * *

E. L. Davenport, Winkler district superintendent of Shell Petroleum Corp. operations in West Texas, makes his headquarters at the field town of

E. L. Davenport

Wink. He works in close association with Charles W. Alcorn, in general charge for West Texas with headquarters at Midland. Mr. Davenport has been in charge of Winkler operations over a long period of time and is widely known in the Permian salt basin producing region.

* * *

Warner Clark, southern manager of the California Co., with Dallas headquarters, has returned to Texas after a business trip to the San Francisco offices of the parent Standard Oil Co. of California. He was accompanied on the trip by J. C. Cunningham of the California Co.'s land department.

* * *

J. O. Mayfield, formerly store manager of the Continental Supply Co., at Refugio, Texas, has been transferred to the Houston sales organization of the same company.

George Klingaman, formerly Yates field petroleum engineer for the California Co., has been transferred to Pacific Coast territory under jurisdiction of the parent Standard Oil Co. of California. George Ballafantz, formerly engaged in scouting the Yates field, will do petroleum engineering work in the Howard-Glasscock territory of West Texas since his recent transfer to Big Spring. O. J. Haynes, Standard geologist, from Los Angeles, has been transferred to Dallas offices of the subsidiary California Co.

* * *

John I. Moore, for more than two years in charge of West Texas offices of the Fuhrman Petroleum Corp., has opened consulting geological offices at 707 Western Reserve Life building in San Angelo.

* * *

Richard L. Triplett is now identified with the geological department of the Western Gulf Oil Co., Subway Terminal building, Los Angeles. He was formerly at Tulsa with the Gypsy Oil Co., Mid-Continent subsidiary of the Gulf Oil Corp., of which the Western Gulf is also an arm.

* * * *

O. L. Brace, vice president and general manager of the Corana Petroleum Co., has moved his personal headquarters to Austin, Texas, from which base he will carry on operation. Mr. Brace has spent much of his time in New Mexico, making headquarters at Roswell, the last two years. Company headquarters are at Corsicana. Mr. Brace was formerly in charge of geological work in North Louisiana and Arkansas for the old Marland Oil Co. of Texas, then making headquarters at Shreveport. He was also stational at Laredo for the Marland interests for a time.

* * *

When equipment men and engineers get together it is always a field day for discussions of operating methods. It may be assumed that Kenneth W. Reed (left), works manager for the Guiberson Corp., Dallas, and J. M. McQuarrie, district engineer of the Shell Petroleum Corp., Wichita Falls, did their full share of discussing on the trip when the accompanying picture was taken.

* * *

W. C. Mendenhall of the United States Geological Survey has been named general secretary of the Sixteenth International Geological Congress to be held in 1932 at Washington.

* * *

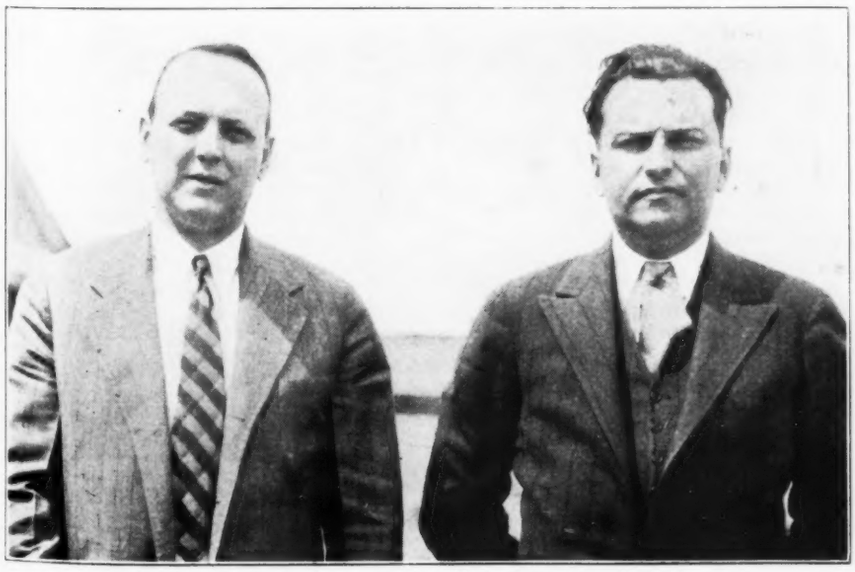
B. Coleman Renick, formerly with the Shell Petroleum Corp., at Dallas, will enter consulting practice, probably opening geological offices at Houston.

* * *

Robin Willis, recently of Midland, Texas, and Calgary, where he has been identified with geological work of the Nordon Corp., Ltd., and its subsidiary Nordon Corp. of Delaware, is teaching the last quarter period at Leland Stanford University, Polo Alto, taking the place of Elliot Blackwelder, absent on leave. At the completion of his present teaching term, Mr. Willis will return to Calgary for the Nordon Corp., Ltd., in which his brother, C. G. Willis of Los Angeles, is largely interested.

* * *

The Independent Petroleum Association of California, affiliated with Wirt Franklin's national organization at Ardmore, Okla., is headed by Verne Dumas, president of the Apex Petroleum Corp., a former Texan. S. C. Graham is vice president, Oscar Schmidt treasurer, Guy Pitt secretary and R. R. Woolley general counsel. Others on the board of directors of the California association are Dan Danciger, Orville Seeple, Henry S. Woolner and Ivey C. Clarke. R. L. Gilmore, geologist and engineer of Bakersfield, who attended the Fort Worth convention of the national organization, is chairman of the San Joaquin Valley division of the California association.



Kenneth W. Reed and J. M. McQuarrie

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Automatic Control of Pumping Wells Is Safe With Electric Robots

By William F. Lowe
N. P. N. STAFF WRITER

TULSA, April 5

THE installation of an automatic power control considerably simplifies the intermittent pumping of wells by electric motor. Not only does this simple device result in a greater recovery of oil but it cuts the overhead in no uncertain manner. By its use a well may be started or stopped at predetermined intervals day, or night, the entire process being automatic. In connection with it, certain safety devices aid in eliminating the human element and the combination tends toward the greatest pumping efficiency.

It has always been a difficult matter to keep wells on a close pumping schedule if leases are at all scattered. Even on a single property only a degree of regularity is possible in 24-hour operation, unless two men are employed in shifts. On many fairly large leases where the daily average production per well is small, the expense of the additional labor is unwarranted and it is seldom that isolated small properties need a full time pumper. In either case, a reduction in labor and operating expense, by any means at all, often represents the difference between a fair profit and a loss due to lifting cost.

If the pumping schedule is based on the study of individual well performance then the closer that schedule is followed the better will be the return from the lease. The fact that no two wells are alike, except in the general classification of small producers, requires that each should receive different treatment.

The pumper is usually inclined to regard them as a group rather than individuals and the result is that even the best schedules may sometimes go away if left entirely to him. By putting the well pumping intervals outside of his control, except in supervision, the automatic switch makes for increased efficiency.

The idea of automatic power control is not new, as several types have been in use for some time. The Midwest Refining Co., began developing an automatic switch for use in the Salt Creek field of Wyoming, several years ago. The contrivance was so successful that it was quite generally applied in that area and others were sent to the Texas holdings of the company.

In the Panhandle, especially in the Borger and Pampa districts, other companies have been experimenting with similar devices and the Phillips Petroleum Co., has developed a very efficient one. Many of its wells there are now equipped with them and several more are being installed by the company on leases in the Seminole area of Oklahoma.

On the Wallace lease of the Phillips in 17-8-5E, north of Maud, the only remaining producer is operating by automatic control. The well is also equipped with the electric safety devices and requires a visit from the pumper of another lease only once a day. As this operating method is perfected it will be widely used by the company and, according to engineers' estimates, the resulting cut in lifting cost will more than warrant the expense of installation.

The prime mover on the No. 1 Wallace is a 25/55 horsepower 440-volt, three phase motor mounted on an O.C.S., reduction unit. The motor is of the variable speed induction type with polar wound rotor. To this rotor are connected the resistors which, in turn, are connected in series with the governing controller.

The automatic control is mounted on the wall of the engine house and is composed of a small motor wound clock with a face having 24 notches around its edge. Each of the latter represents a potential hourly setting. Metal pegs are set in them at the desired intervals and as the face of the clock rotates, these pegs catch a trip which operates the switch.

THE switch itself is a unique device. It is a glass tube, two and one half inches long, closed at both ends and containing an ounce of mercury. It is balanced horizontally in a light frame which is pivoted when the pegs of the clock move an arm set at right angles to the tube. On the bottom side of the glass tube near its left end, an electric wire is melted into and through the glass to the inside and just beyond the center of the tube to the right another wire is attached.

When the switch is in the "off" position, the tube is slanting down on the right hand side with the mercury covering but one point. As the trip is worked by a peg on the revolving clock face, the position of the tube is reversed and the mercury flows into the end at the left. In this position the liquid covers both points and completes a circuit to the control box of the motor. The well then starts pumping and continues for a predetermined interval when the tube is again tipped to the right, breaking the circuit and stopping the motor.

Near the automatic switch is a small transformer which steps the current down from 440 volts to 120 volts. This lighter current is used for turning the motor of the clock. A hand switch in the same panel is hooked up around the automatic control so that the full 440 volt power may be used during rod or tubing pulling operations.

On the clock face edge of this particular well but three pegs are placed, two for starting and only one for stopping. The well is pumped automatically for a short period during the night and starts again automatically early in the morning. No pumper is in attendance on the lease and, being considerably removed from other properties of the company, it is necessary for a pumper from another Phillips lease to stop the well. In this way it is possible for one man to serve two leases and still keep the wells of both producing the maximum amount of oil.

DUE to the great weight of the rod string and the fluid column in a 4400-foot well, it is necessary to even up the load on the motor by the use of a very heavy counterbalance. In the event that either of these weights should suddenly be removed, as would be the case if the rods parted or the counterbalance dropped, a great strain would be put on the motor. On a well of this depth even a motor as large as the one here used would be held stationary by so uneven a load. It is quite probable that it would be burned out if the power were not shut off immediately and there is also the hazard of fire to the surrounding property.

To prevent such an expensive accident, the balance and the rods are both attached by light chains to circuit breaking cutouts. These cutouts are ordinary socket plugs and are hooked up in series to the motor controller. A jerk on either chain pulls out a plug and automatically shuts off the power.

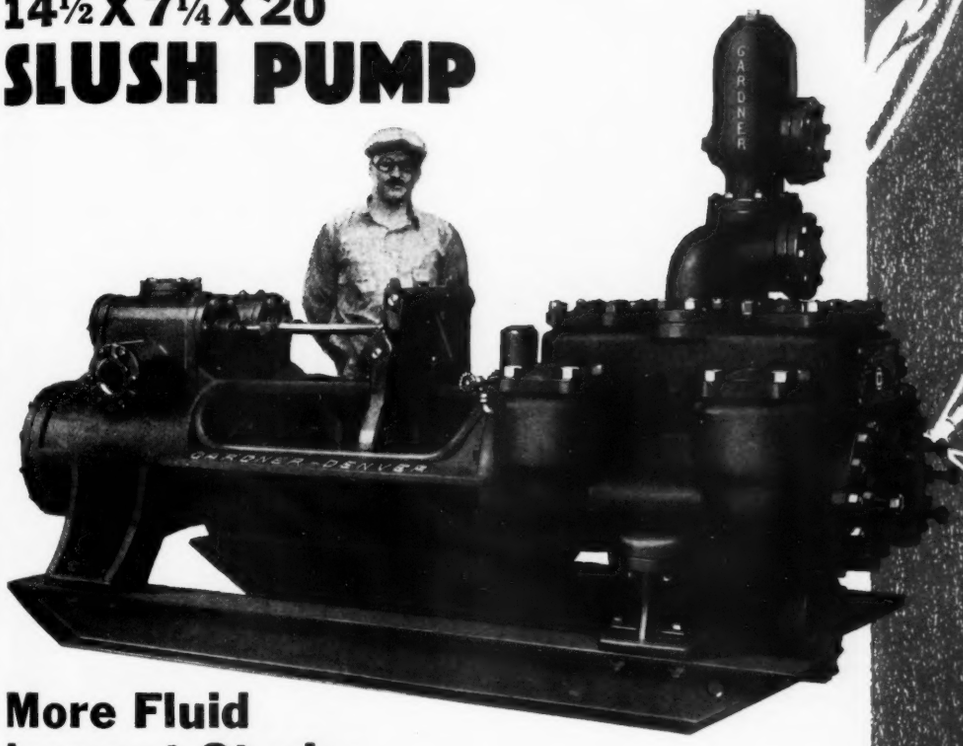
The engineers of the Phillips Petroleum Co., are working on many refinements of the automatic pumping system, both in the clock switch and in the safety cutouts. A different clock face is being developed and the plugs on the headache post and on the belt house above the counterbalance are to be made vapor proof. However, as the equipment now stands it is very efficient and considerably reduces lifting costs.

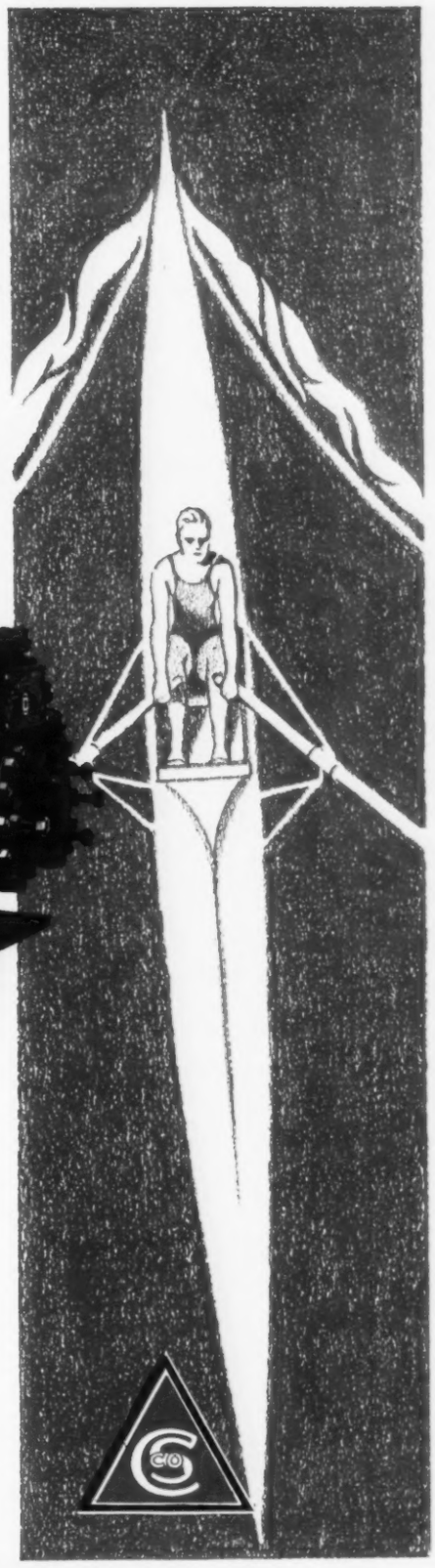
LONG STROKE

SMOOTH RUNNING

GARDNER-DENVER

14½ X 7¼ X 20
SLUSH PUMP





More Fluid
Longest Stroke
Divided Fluid End
Rugged Cradle
Steam Piston Valves
More Hole . . . Less Worry

"If Continental Sells It. . . . There Is No Better"

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THE CONTINENTAL SUPPLY CO., LTD.
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Export Offices:
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74 Trinity Place, New York

London Offices: 316-17 Dashwood House, Old Broad St., E.C. 2

J 638

CONTINENTAL

Caching the gold, Captain Kidd style

Tiger Tracks!

Practising Law in Latin America

By R. B. Gaither

MEXICO, D. F.

THE problem of getting the rent moneys to Papantla is somewhat serious, particularly in the rainy season. I had a total of approximately $42,000 pesos to pay including Villa's commission, Mariel's rents on Volador and the rents for the first 10 parcels.

I took a cashier's check from here to Tampico and there obtained gold and silver to take down with me by plane. On account of heavy rains the pastures and flat lands around Papantla were impossible as landing fields since they were all covered with about six inches of water. The only other alternative was to go to Tecolutla which is a little village at the mouth of the Tecolutla River, about 40 minutes from Gutierrez Zamora, by motor boat.

On account of the severe storms that had been raging for three days, the beach at Tecolutla was simply littered with heavy logs which made it impossible to land. We flew from Tampico to Tuxpam by the regular air route and thence to Tecolutla where Mr. Mackey and Joaquin Prieto were both waiting for me. They had attempted to clear a short stretch of the beach but in the judgment of the pilot, the beach was too narrow.

We flew around making a very careful examination of the landing possibilities and decided against landing, but not being satisfied with a mere attempt, we then circled around over various pasture lands which apparently have a sandy subsoil and therefore did not hold the water like the lands around Papantla. After about 10 minutes travel up the beach, we landed in a cow pasture about 300 feet away from the beach and about the only place within a range of 40 miles where we could have landed.

L. G. HUNTLEY, petroleum geologist, Pittsburgh, who has contributed frequently to NATIONAL PETROLEUM NEWS articles dealing with the oddities that arise in foreign fields, sends along the accompanying letter from an attorney who went to a Latin country to pay rentals. He says that as a geologist he is "particularly delighted with an opportunity to gloat over a lawyer's getting in such a predicament, which is a much more common occurrence in the life of an oil geologist."

The pilot asked me if that did me any good. I told him it did because the only other alternative was to lose several days by taking the money back with me to Tuxpam and thence by horseback to Papantla, or hire a barge or a motor boat to bring it by sea with considerable danger of a norther blowing and possibly losing the money. I therefore told the pilot that provided he went back to notify my party that was waiting for me on the beach, that I had landed, I would stay there.

I calculated that Prieto and Mackey could arrive at my location in approximately two hours—therefore, I sat tranquilly in the midst of about a hundred wild steers (who seemed undecided whether to charge me or not) firing a pistol so as to notify our men of my location. After firing for about an hour at regular intervals, I decided that they had passed up the beach without being able to locate me. Meanwhile the pilot had returned and had given me a sign that all was well.

What with the weight of the gold and silver and my baggage, it was impossible for me to carry all the load on my back at once from the pasture to the sea where I thought surely Mr. Mackey and Prieto would pass shortly, so I began to divide my load and by relays carried it across the field. Unfortunately the beach was separated from the pasture by a heavy wild grape tangle that was absolutely impenetrable and I, therefore, had to carry my load approximately 3 kilometers down the pasture. And it was hot! Incidentally I saw the largest tiger track I have ever seen, measuring across the forefeet about five and a half inches.

Arriving close to the beach, I began to fire my pistol again. Since I had the bags of silver and gold separated from my other baggage and lying on the beach it was perfectly obvious what I had with me. A mule driver hearing my firing came to

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see what it was all about and seeing me with these bags looked at me for a few minutes, then I saw him beating his mules in order to make as fast a trip as he could, to just what purpose I was unable to imagine unless to get some of his friends to come and help relieve me of my burdens. He did not return—nor did the tiger.

At about 8 o'clock that night (I had landed at about 3:30 in the afternoon), I reached the beach, simply soaking wet with perspiration because it was one of the hottest days I had ever felt. I think all or nearly all the available moisture in my body evaporated. Naturally I had no water with me nor any food and since in the morning I had had no time for breakfast and had left before lunch time in Tampico, I was somewhat hungry and exceedingly thirsty.

After waiting until 9 o'clock that night I decided that the chances were that for some reason the signal of the pilot had miscarried and that Mackey and Prieto had not understood it, so I proceeded to make my bed in the sand along with those big green crabs that bite you first to see you move, pinolillos y garrapatas and mosquitos by the million.

I built a large fire out of wet wood. How I started it I cannot tell you, but I made a fire which I thought they could see from Tecolutla. Obviously it was impossible for me to leave the gold on the beach and go for help and simply no one else passed by. My tongue was stuck to the roof of my mouth and began to swell for lack of water. In desperation I began to dig in the sand hoping that I would find fresh water within a few feet. To my surprise and gratification, at a depth of about two feet, I struck fresh water, full of sand and a sort of foam which under other circumstances not even a doctor could force down my throat. I drank about a litre of this water, straining the sand through my teeth which made me regret extremely that I did not have a large, drooping, western moustache for the purpose.

That night it rained three times, sufficient to soak me through each time and in moving one of the bags, the bottom fell out scattering about $20,000 pesos in Aztecas on the loose sand. I spent most of the night looking for the twenty thousand pesos. Several times I tried to sleep, but the same cattle that had welcomed me on my landing, being of a sociable disposition, would approach me to within about six inches and begin to snort and paw the ground, which, of course, would awaken me, but as soon as I moved they would run away like the devil himself was after them.

In between the rains it was one of the most beautiful nights I have ever seen, with the moon rising about 9 o'clock, over a perfectly wild and desolate scene that only lawyers who practice law in Latin America ever have the privilege of seeing and appreciating—except perhaps Geologists.

In the morning I took a shotgun that I was taking down to Villa and looked for some sort of an animal that I could roast over my fire. The only animal I saw fit to eat was a rabbit but he saw me first. I believe I would have eaten a buzzard if I could have gotten one.

At about 9 o'clock I decided finally that the message of the pilot had miscarried and that the only thing for me to do was to walk to Tecolutla, about 15 miles. I therefore dug a trench in the sand and buried my silver and gold, even as Captain Kidd must have done in his days. I hid my baggage in the wild grape tangle and proceeded, not very merrily, on my way. Midway between Tecolutla and my camp, the Veracruz plane passed and I found later that the very pilot who had left me stranded was on that plane. Remembering some of my semaphoring of the army days, I sent him a message which he got! The message was "Go to H. . . . !"

After two hours and a half of hard walking I arrived at Tecolutla where I proceeded to drink first a quart of orange juice and then a quart of coffee and ate a half dozen eggs. Then I sent a message to Gutierrez Zamora to Mackey and Prieto who were still waiting for me to come and get me. They immediately appeared and explained that the pilot instead of returning over their heads to where they could see that the passenger was no longer in the plane, had not come wtihin less than three miles of them and they naturally supposed that I had returned to Tuxpam or Tampico, giving up in despair the possibility of making a landing. Therefore, the fault was entirely the pilot's and not either Mackey's or Prieto's.

We hired a horse and wagon and returned to my hidden treasure which I duly proceeded to excavate. We thereupon returned to Gutierrez Zamora. We stayed that night at Guttierrez Zamora and the next day traveled to Papantla, arriving there about noon.

All the rents have been paid and receipts duly obtained.

Mackey and I returned, leaving Papantla Friday on horseback, or rather I was on a mule, and from Tuxpam to Tampico by plane, arriving at approximately 6 o'clock Saturday. Friday I was 20 hours in the saddle and Saturday eight hours after four hours sleep Friday night.

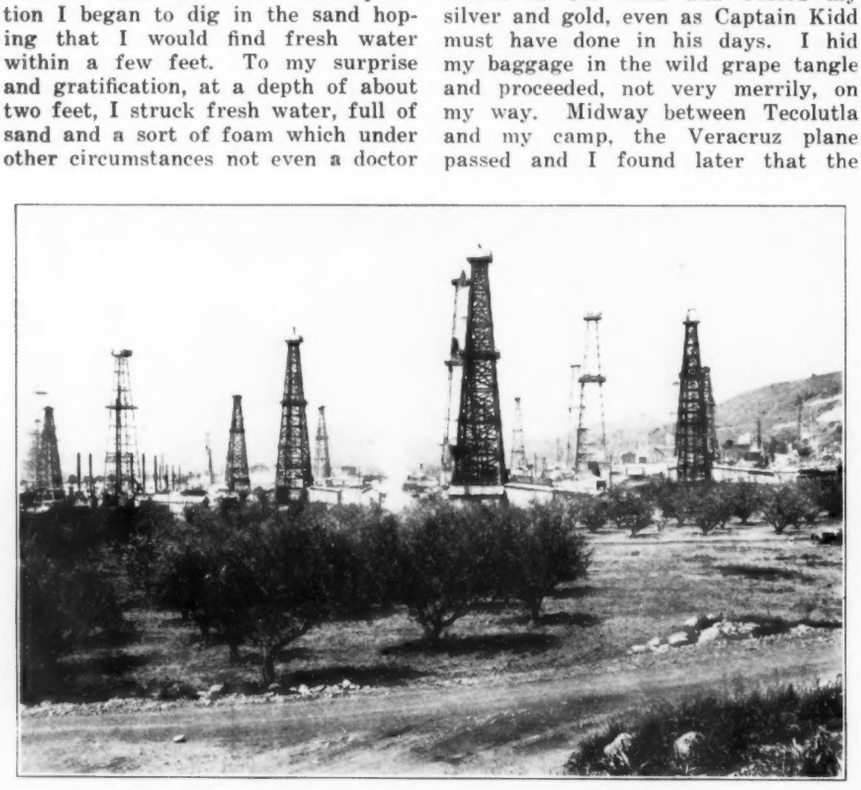
Saturday I went to a dance with Gibsone, where I had the pleasure of speaking to Portes Gil and meeting Amaro and members of the Cabinet and military officials, proceeding Sunday by plane to Mexico City. Fortunately, I am none the worse for wear.

I am writing this letter in detail to illustrate to you just how difficult it is to get the money to Papantla and how necessary it is to have somebody there always in Papantla to receive it or help others receive it.

I discovered afterwards that everybody in the country knew I had the money and that I was expected by airplane. It is not beyond the realm of possibilities that some friendly bandits might have been waiting for me or at least that the arriero might have returned on a special mission. Incidentally the front sights on my pistol are very high. It is a risk which from a practical standpoint must be eliminated as much as possible. Perhaps when we get going we may be compelled to prepare our own landing field.

Very sincerely yours,

R. B. Gaither.



Among the peach trees in the Ventura Avenue field

Students and engineers attending the Student chapter meeting of the A.I.M.E. From left to right I. F. Bingham, R. T. McNally, A. M. Sullivan, H. A. Ireland, A. O. Spina, L. M. Coronado, W. O. Wethington, chairman of the Student Chapter, J. K. Kalb, W. L. Crothers, G. B. Grumbein, R. R. Hawkins, F. A. Norris, R. E. Maxwell, H. H. Power, S. Weidman, R. D. Robey, Frank Ittner, E. S. Smith, R. L. Six, R. R. Leonard, G. L. Nye, J. E. Couch, Blue Sidwell, Dr. H. C. George, dean of the College of Engineering, C. V. Milliken, L. E. G. Bignell, G. P. Livermore

Four Hundred Attend Meter School; Student A.I.M.E. Meets

By John Power

N. P. N. STAFF WRITER

LECTURES, papers, and equipment covering nearly all phases of the measurement of both wet and dry gases featured the three day session of the Southwestern Gas Measurement Short Course, offered by the College of Engineering of the University of Oklahoma at Norman April 15, 16, and 17.

Coincident with the Meter School the Student Chapter of the Mid-Continent Section of the American Institute of Mining and Metallurgical Engineers held a meeting, attended by both students of the university and by several engineers from oil companies. The A.I.M.E. meeting was addressed by Dr. G. E. Anderson on the geology of the Oklahoma City field, and by G. B. Grumbein, of the Wirt Franklin interests, on proration as practiced in the same field. Mr. Grumbein titled his remarks under the heading of "Proration that does not Prorate, and Conservation that does not Conserve."

The meter school split its days into two sessions. The mornings were given over to general assembly, at which time papers on such subjects as domestic and large capacity meters, high and low pressure regulators, measuring the open flow of gas wells and the calculation of meter charts were read. In the afternoon periods classes were held in which detailed attention was paid to various phases of the subjects discussed in the general assembly.

In discussing the open flow of gas wells J. W. Bartlett said that "The next few years will yield greater knowledge which will enable us to eliminate the waste of gas which the relic known as "open flow test" imposes on us. Already large savings have been effected by reducing the frequency of these tests, and we may expect before long to see new methods recognized by the regulatory bodies, and in general use."

Mr. Bartlett told of some of the newer methods of arriving at gas well potentials. He said, "The plan of the Bureau of Mines is to observe the pressure at the well head for rates of delivery. Adding the friction loss, and the weight of the column of gas to the well head pressure at the face of the sand (P_s). The shut in pressure at the well head is observed, to which is added the weight of the column of gas in the well to obtain the formation pressure, (P_f). The amount of gas which the sand will deliver is a function of the difference of the squares of these quantities; that is Q equals C $(P_f^2 - P_s^2)^n$. The exponent may be obtained by plotting the observed results on logarithmic paper, and the coefficient is determined by substituting known values of Q, P_f, P_s, and n in the equation.

"The open flow capacity may be calculated by plotting the pressure at the bottom of the well (P_s) against the volume which it will deliver through the producing string. Knowing the formation pressures, we may plot the volume of gas which the sand will deliver at various bottom hole pressures (P_s). If these curves are superimposed, the point of intersection shows the quantity which the well will produce."

Mr. Bartlett outlined another method of arriving at much the same result which had been used on wells under his charge in South Texas. He said, "Satisfactory estimates of the well's capacity were obtained by merely observing the pressure at the well head for various rates of flow. By plotting the results on logarithmic paper and projecting the resulting line to zero, the calculated capacity was obtained. In making these observations, it was customary to take the largest volume first in order to clean the well before making the test. This method is, of

D. A. Sillers, of the Lone Star Gas Co., who served as presiding officer of the school session

course, not extremely accurate, but has the advantage of simplicity. It is not applicable to wells having large volumes in comparison to the size of the producing string, or to wells having a low shut-in pressure.

In all of the work which has been done, a serious handicap has been met in the open flow tables commonly published. These tables contain serious errors due to the fact that they are based on theoretical considerations which do not hold true. Where the impact pressure is less than ten pounds, the error increases with the pressure. With an impact pressure of 70 pounds, the old tables show only half of the gas actually produced.

In 1929, a new set of tables was published by Walter Reid which was based on extensive data acquired by large scale experiments. In the course of these experiments, it was demonstrated that the adiabatic formula, upon which the old tables were based, does not apply, but that the quantity is governed by the hydraulic formula."

In discussing the geology of the Oklahoma City pool Dr. Anderson outlined the relative position of the Garber sandstone and the Hennessy shale. The surface of the Oklahoma City nosing put the sandstone about 400 feet higher than its position should have been had it followed the normal dip. It was this nosing that first attracted geological attention to the area, he said.

The fault, which is generally conceded to lie along the east flank of the pool Dr. Anderson stated was probably in the Pre-Pennsylvanian beds, and accounted for the steep dip in the formations encountered in wells drilled on the east of the pool, off structure.

The absence of the expected production in the Layton series, which Dr. Anderson described as a hard, porous sandstone, was attributed, he said, to migration of the oil. That the formation had at one time contained oil in presumably large quantities he said was more than likely.

The possibilities of the water migrating through the loose beds in the Arbuckle, and trapping the oil not as yet produced was pointed out by him. There were also possibilities, he said, of the water getting into the sand wells from the Arbuckle.

Mr. Grumbein, outlined the proration and conservation policies as practiced in the Oklahoma City pool, said that it was his opinion that the present methods did not achieve the desired results. Flowing the wells on a time basis, was, in his opinion, not the best way to extract all the oil possible from the sand.

The method, he said, presented too many chances of permitting water encroachment, and of wasting the propulsive force of the gas in the pay. Leaving one well shut in while another well close by was permitted to run wide open was a method which he said was bound to drive the oil from the first well across the line to the well then producing.

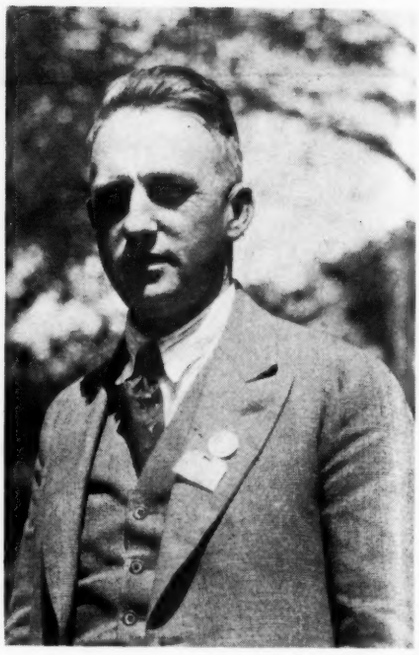
That when the conditions of the wells were reversed the oil would be driven back, and the total evened up he did not consider as probable, especially where the rock pressures differed greatly. In his opinion, a more equitable, and sounder method of prorating the production would be to back pressure all wells on some percentage plan which would provide for an equitable production of the well according to its potentialities, and which would at the same time, keep the oil in the ground when it was not needed for the market.

* * *

Class Room Notes

Many equipment manufacturers had their wares displayed for the benefit of students at the Meter School. Salesmen in attendance explained to those interested how the various measuring and regulating devices worked.

R. R. Leonard, field secretary of the Mid-Continent section of the American Society of Mechanical Engineers visited the Meter School



C. W. Dingman, petroleum engineer with the department of the interior of the Canadian government. Mr. Dingman is from Calgary, Alberta

* * *

After a few appraising looks at the University Co-eds tripping lightly about the grounds many of the harder-boiled field men attending the Meter School were heard to admit that there might be something to this co-education, after all.

* * *

The Meter School attracted students from more than 20 states, and from two foreign countries, Canada and Peru. Some 420 were registered not counting university engineering students who attended some of the sessions.

* * *

The Student Chapter of the A.I.M.E. proved to be a wide awake bunch of scholars interested in getting a start in their chosen profession and eager to make contacts with engineers who are practicing the profession in the oil country.

CHICAGO.—The bi-monthly house organ of the Link-Belt Co., 910 S. Michigan Ave., here contains news and facts about the company's materials handling and power transmission chains and machinery.

The March edition includes an article telling how an auto laundry in Oregon washed and dried a car in nine minutes, by careful timing of each operation and by the automatic conveyor system which keeps the car moving along the line.

ADVERTISING PAGES REMOVED

Modern Refining—Science and Practice

By Colonel George A. Burrell*

Article 21

Evaporation Losses from Tanks

Factors which control evaporation; Eight conditions desirable to obtain in storage; Vapor tight tanks; Rates of evaporation in gasoline storage tanks

A GREAT deal of attention has been paid in recent years by refiners to decreasing evaporation losses of gasoline. These losses can occur from run down tanks, storage tanks (both crude oil and gasoline storage tanks), agitators, tank cars (while loading) and during pumping; in fact any place in the refinery where light distillates are exposed to the air.

Ludwig Schmidt[1] of the U. S. Bureau of Mines, in 1926, estimated evaporation losses of gasoline during early spring and summer months at Mid-Continent refineries, as follows:

	Per Cent
Run down tanks	1.8
Treating	0.5
Filling tank	0.5
Storage	2.5
Misc. Handling	1.0
Total	6.3

Results of tests made by Schmidt covering gasoline storage tank losses, follow:

Tank F-1
10,000 bbl. capacity
Tank painted dark gray
Umbrella type roof—badly distorted
Roof not calked
Roof leaking
Hatch cover held open by swing line
Tank filled with 58.9° gasoline

Tank F-2
10,000 bbl. tank
Tank similar to F-1, but in better condition
Tank filled with blended gasoline containing high per cent of natural gasoline

Tank F-3
10,000 bbl. tank
Tank in better condition than F-1 and F-2
Tank filled with 73.9° blended gasoline

Tank G-1
25,000 bbl. tank
Tank roof conical and painted white
Hatches not vapor tight
White roof
Gasoline of 60.2° Gr.

Tank G-2
25,000 bbl. tank
Painted gray and conical roof
Tank in better condition than G-1
Blended gasoline of 60° gr.

(*Results of tests shown on page* 66 *—Editor*).

Schmidt calls attention to the following points to be observed in order to minimize evaporation losses.

"(1) Bad foundations and grades will cause the tanks to distort, and further rivet holes will not line up evenly.

"(2) Locate all thief hatches, valves and other fittings near the edge of the tank so the gager will not have to stand or walk on the roof of the tank.

"(3) Vapor tight tanks should be equipped with vacuum and pressure relief valves, and vapor tight thief and gage hatches. Swing lines should enter the tank through a stuffing box.

"(4) Tanks should be fitted with as low a dome or roof as possible so as to reduce to a minimum the amount of air over the oil. Over capacity tanks should not be used. Using them enlarges the vapor space."

It is the entrance of air into the tank space above the liquid which brings about evaporation losses. The air-vapor mixture above the oil contracts and expands, first pulling in air which more or less saturates itself with gasoline and then discharging the gasoline laden air. This process keeps up indefinitely and results in large losses during hot days and cool nights.

Fleming[2] discusses the factors which control evaporation, naming as the three fundamental ones,

"(a) The area of oil surface exposed.

"(b) The amount of unsaturated air passing over that surface.

"(c) The degree to which the air becomes saturated with gasoline before leaving the tank."

Fleming adds that the conditions upon which the above factors depend can be listed as follows:

"A—From windage.
- (a) Tightness of the roof and fittings.
- (b) Number and location of vents.
- (c) Breather valves on the vents.

"B—From breathing.
- (a) Volume of vapor space.
- (b) Degree and frequency of temperature variations in vapor space.
- (c) Pressure at which valves are set.
- (d) Degree of unsaturation of air inhaled (where it comes in whole or in part from some type of gas holder)."

The degree to which the air becomes saturated depends upon the following three factors:

"A—Vapor pressure of the oil.

"B—Temperature of oil at the surface.

"C—Time which air is left in tank. This is important only in a tank which is frequently worked."

Fleming adds that from a study of the foregoing factors there are eight

[1]Address before Western Petroleum Refiners Ass., Fort Worth, Mar. 3, 1926.

Note—One of the greatest contributions ever made to the petroleum industry was the work of the Bureau of Mines on evaporation losses, by Schmidt, Dow, Wiggins, and others.

*Consulting Chemical Engineer, Pittsburgh, Pa.

[2]NAT. PET. NEWS, Sept. 21, 1927, p.34.

Results of Evaporation Tests on Gasoline Storage Tank F-1

Date	Volume at 60° F. Bbls.	Average Temp. of Gasoline in Tank °F.	Surface Temp. of Gasoline °F.	Evaporation Loss Barrels	Evaporation Loss Per Cent
April 8	10,226	64	85	.....	.....
May 1	10,058	63	83	168	1.64
May 17	9,954	71	86	272	2.66
June 1	9,858	72	88	368	3.60
June 10	9,800	88	111	434	4.25

Distillation Records of Samples of Gasoline Taken at the Beginning and the End of Gasoline Storage on Tank F-2

Gravity °A.P.I. Per Cent Recovery	Beginning of Test 69.3 Temp. °F	End of Test 65.7 Temp. °F	Gravity °A.P.I. Per Cent Recovery	Beginning of Test 69.3 Temp. °F	End of Test 65.7 Temp. °F
First drop	78	102	50%	244	253
10%	116	131	60%	280	288
20%	142	151	70%	311	320
30%	174	183	80%	335	358
40%	208	208	90%	438	443
			End Point	442	451

Results of Evaporation Test on Gasoline Storage Tank F-2

Date	Volume at 60° F. Bbls.	Average Temp. of Gasoline in Tank °F.	Surface Temp. of Gasoline °F.	Evaporation Loss Barrels	Evaporation Loss Per Cent
March 14	10,321	41	43	.....	.....
April 1	10,229	48	52	92	8.7
April 8	10,131	61	68	190	1.8
May 1	9,992	64	70	339	3.8
May 17	9,878	71	84	443	4.3
June 10	9,743	83	93	578	5.6
July 1	9,646	78	80	675	6.5

Distillation Records of Gasoline Samples Taken at the Beginning and at the End of Test on Gasoline Storage Tank G-1

Gravity °A.P.I. Per Cent Recovery	Beginning of Test 60.2 Temp. °F	End of Test 58.7 Temp. °F	Gravity °A.P.I. Per Cent Recovery	Beginning of Test 60.2 Temp. °F	End of Test 58.7 Temp. °F
First drop	84	109	50%	274	282
10%	155	175	60%	294	298
20%	202	217	70%	320	318
30%	230	242	80%	340	348
40%	254	263	90%	374	380
			End Point	436	435

Results of Evaporation Test on Gasoline Storage Tank G-1

Date	Volume at 60° F. Bbls.	Average Temp. of Gasoline in Tank °F.	Surface Temp. of Gasoline °F.	Evaporation Loss Barrels	Evaporation Loss Per Cent
April 8	25,006	63	75	.....	.....
May 1	24,869	63	75	137	.55
May 17	24,736	68	80	270	1.08
June 1	24,670	70	85	336	1.34
June 10	24,573	80	93	433	1.73
		Tests on Tank G-2			
March 13	24,086	44	44	.....	.....
April 15	23,797	69	84	289	1.2
May 25	23,622	69	69	464	1.92
June 20	23,417	86	93	669	2.79

conditions which it is desirable to obtain, as follows:

"(a) Minimum oil surface exposure.

"(b) Gas tight roof and roof fittings.

"(c) Breather valve on vents.

"(d) Minimum vapor space.

"(e) Minimum temperature variations in vapor space.

"(f) Roof capable of holding maximum pressure.

"(g) Minimum temperature of oil at surface."

Fleming cites one large oil company which after two years' survey found that its evaporation loss in steel roofed tanks was made up of two-thirds windage loss and one-third breathing loss. He adds that it takes a very small opening at the eaves or roof seams to cause a current of air to blow through the tank, especially if there are open vents.

Conservation of gasoline vapors on the leases started in November, 1922, when the Prairie Oil & Gas Co. placed a premium on high gravity Mid-Continent crude oil. Then it became advisable to save light ends of the oil so as to keep the gravity up. For many years wooden oil tanks had been used without a roof. Next they were covered and made reasonably tight. Then they were in large measure replaced by bolted steel tanks, and these, to a considerable extent, have given way to bolted, riveted, or welded, gas tight flow tanks. Some of these will withstand a pressure of several pounds per square inch.

Stalcup[3] mentions one company which installed welded vapor tight tanks at a cost of $100,000, and increased its revenue by $144,000 thereby, in something over one year's time. These tanks can be skidded, or trucked, to new locations at a fraction of the cost of moving older forms of tanks. They last 25 years or more.

The former Waite Phillips Company[4], Okmulgee, Okla., reported concrete savings using vapor tight steel roofs and taking off the vapors and condensing them. With 5500 bbls. of crude oil handled per day they save 82½ barrels of gasoline per day. This pays for the extra cost of vapor tight roofs in three months. They add that besides being responsible for vapor losses, wooden roofs, are expensive to maintain in that they require a rather complete overhauling; costing $600 for labor and material, every two years.

Another company reports that at two of its tank farms in Oklahoma they have several vapor tight tanks, of 5500 and 80,000 barrels capacity, equipped with mercury safety valves, which limit the pressure or vacuum to approximately a half ounce per square inch. The vapor is discharged and the vacuum relieved by vents carried over the sides of the tanks. A 10-inch pipe is used in the case of the 80,000-barrel tanks and an eight inch pipe for 5500-barrel tanks. Fine mesh wire screen pipes to keep a flame from igniting the tank in case of fire.

In tanks that are not vapor proof the loss by evaporation averages between 7 and 8 per cent for the first year or two. This is reduced approximately to 1 per cent in vapor proof tanks equipped with safety valves. A 6 per cent reduction means a saving of 4800 barrels of gasoline per year. At 8 cents per gallon this is $16,128 for one 80,000-barrel tank. As the additional cost of a vapor tight roof is $6,000 the extra expense is repaid by the oil saved in five months. It was found that by painting the roof and top ring of the tanks with aluminum paint that the oil kept 30 degrees F. cooler than with tanks painted black or red.

H. T. Morley[5] has made on tests on Grass Creek (Wyoming) crude oil to determine evaporation losses from open and gas tight 250-barrel tanks. In each test the tanks were steamed. The tests were conducted in cold weather. The results follow:

Test 1—Oil Direct from Wells

31½ hours filling	
130½ hours standing and steaming (live steam)	
Loss from open tank (130½ hr.)	13.65 bbl.
Loss from tight tank (130½ hr.)	2.96 bbl.
Total barrels saved	10.69 bbl.
Average saved per day	1.96 bbl.
Loss in gravity (162 hr.) open tank	3.1° Be.
Loss in gravity (162 hr.) tight tank	0.5° Be.
Total saved	2.6° Be.

Test 2—Oil from Flow Tank

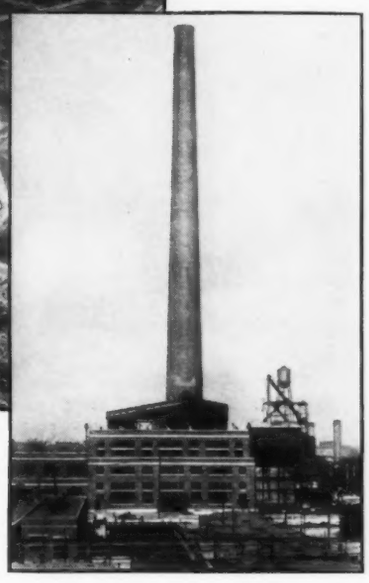
32 hr. filling	
73.3 hr. standing and steaming (live steam)	
Loss from open tank	5.48 bbl.
Loss from tight tank	1.85 bbl.
Total saved	3.63 bbl.
Average saved per day	1.2 bbl.

[3]Nat. Pet. News, Sept. 21, 1927, p.308.

[4]Nat. Pet. News, May 12, 1925.

[5]Nat. Pet. News, Aug. 20, 1924, p.53.

BULK STORAGE PLANT
Staten Island



POWER PLANT
Utilizing Refinery Waste Products
Port Arthur, Texas

Building two plants for the Gulf Refining Company

A 1,920,000 barrel oil storage plant on Staten Island, and a power plant at Port Arthur, Texas, built simultaneously in fast time.

TO SERVE the New York market, the Gulf Refining Company required a new storage plant on Staten Island. At the same time a large new power plant was needed at the refinery at Port Arthur, Texas.

We were called in to design and build both plants.

The storage plant on Staten Island has a capacity of 1,920,000 barrels, occupies 40 acres, and includes twenty-four 80,000 barrel oil tanks, steam plant, two drainage pumping stations, oil pumping station, fire pump and substation, dock for oil tankers, 9 miles of oil pipe mains, 18 miles of foamite pipe, 8 miles of steam pipe, 4 miles of levees, 3 miles of streets and roads, 4 miles of water mains, 2 miles of electric pole lines.

We did all this work—design and construction—with our own forces in six months' time.

The power plant at Port Arthur, designed to utilize refinery waste products—sludge oil and pulverized paraffin petroleum coke—contains 3 boilers of 15,400 sq. ft. each and a turbine of 10,000 kw. capacity. It was also built in six months.

As usual, the work was executed in close co-operation with the client's organization.

We are prepared to serve oil companies in the design and construction of storage plants, refinery buildings, power plants, pipe lines or work of almost any nature.

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MAXIMUM RETURN TO CLIENTS PER DOLLAR INVESTED

Loss in gravity (95.3 hr.) open tank	2.2° Be.
Loss in gravity (95.3 hr.) tight tank	0.6° Be.
Total saved	1.6° Be.

Test 3—Oil from Flow Tank

30 hr. filling	
17.2 hr. standing and steaming (using coils)	
Loss from open tank (17.2 hr.)	7.88 bbl.
Loss from tight tank (17.2 hr.)	1.45 bbl.
Total saved	6.43 bbl.
Loss in gravity (47.2 hr.) open tank	1.3° Be.
Loss in gravity (47.2 hr.) tight tank	0.1° Be.
Total saved	1.2° Be.

Test 4—Oil Direct from Wells

56.5 hr. filling	
34.8 standing and steaming	
Loss from open tanks (34.8 hr.)	5.80 bbl.
Loss from tight tanks (34.8 hr.)	2.57 bbl.
Total saved	3.23 bbl.
Average saved per day	2.2 bbl.
Loss in gravity (91.3 hr.) open tank	2.9° Be.
Loss in gravity (91.3 hr.) tight tank	1.4° Be.
Total saved	1.5° Be.

The average saving per tank of oil handled, figuring the average time of handling and average loss per day (disregarding Test 3) is 4.5 barrels. At the present rate of production of the Grass Creek Field, February, 1923, this saving amounts to approximately 10,850 barrels per year and is essentially gasoline.

Fleming[6] cites the case of twenty-seven 55,000-barrel tanks filled with a good grade of Oklahoma crude oil and undisturbed for seven years. The roofs were of wood covered with sheet steel and tar paper. In the seven years the oil lost 17½ per cent in volume and 4.9 degrees in gravity. The loss the first year was 7 per cent and the last year 1 per cent.

Fleming adds that gasoline in tanks with old style roofs of 1½-inch to 1-foot pitch with loose riveting and open vents will evaporate at the rate of 5 to 7 per cent annually, and even faster if the roof is in bad condition or gauge hatches do not close tightly. He states that the following figures are fairly representative of the evaporation of Mid-Continent crude oil stored in large tanks after the lightest fractions have been lost in the lease storage.

Wood roof tanks	3 to 6 per cent
Wood roofs with gas tight insulated tank tops	¾ to 1½ per cent
Old style steel roofs	2 to 2½ per cent
Gas tight steel roofs with breather valves	½ to ¾ of 1 per cent

Also another company that put a 60 gravity naphtha cut from Oklahoma crude oil in storage. This top cut was 10 per cent of the crude oil. At the same time some of the untopped crude oil was put in storage, in 55,000 barrels. After standing in storage a few years the gravity and distillation curves of the topped and untopped crude oils were nearly identical.

Herthel and Mendius[7] in determining gasoline losses from a 55,000-barrel crude oil tank containing Mid-Continent crude oil, found that the oil evaporated at the rate of 7 barrels per day (4.7 per cent of the volume). The tests were made in the spring and early summer. Other observations were:

"(a) The effectiveness of an insulated roof in reducing breathing is less than water spraying.

"(b) Breathing is not proportional to tank voidage. Evaporation with partially filled tanks is not much greater than with full tanks.

"(c) Exhaled gases may contain 16.5 gallons of gasoline per 1000 cubic feet.

"(d) Tests made on pumping-in-breathing for gasoline and crude oil developed this breathing to be an average value of 160 per cent of oil displacement. On the basis of 160 per cent breathing, oil volume loss for each transfer is calculated to be 0.27 per cent.

"(e) In a refinery having two 55,000-barrel crude oil tanks and three 55,000 gasoline storage tanks, the calculated daily losses and recoverable values are:

"(e-1) Volume of exhaled gases=500,000 cubic feet.

"(e-2) Heating value of exhaled gases=600,000,000 B.t.u.

"(e-3) Liquid volume loss = 126 barrels.

"(e-4) Liquid loss=1.26 per cent on the crude oil.

"(e-5) Liquid volume recoverable =0.60 per cent on the crude oil.

"(f) Standard breathing tests on pressure distillate tankage showed practically identical with that of gasoline tankage breathing, the breathing for given oil levels being proportional to surface exposed."

Buck[8] found that evaporation from Mid-Continent crude was 10 per cent for six days on the lease in an open tank, 2 per cent during gathering, 1.25 per cent pipe line loss over 21 days, 0.60 per cent for the first months storage, 0.35 per cent for the second month, and 0.25 per cent for the third month. The total loss was 14.5 per cent.

With properly equipped and operated tight lease tanks carrying some pressure, the above losses fell to a negligible lease loss, and a total loss of about 10.75 per cent; further that there have been many cases where the savings shown by properly designed, equipped and operated tanks amount to as much as 10 to 15 per cent of the lease production.

Producers are paid a premium for high gravity crude oils. Hence Buck has shown the relations, for many fields, between volume loss and gravity. This varies from 45 gravity for fresh crude oil to 42 gravity for 5 per cent loss, down to 33 gravity for 35 per cent loss. The curve is not quite a straight line but bends slightly to the right.

[6] NAT. PET. NEWS, Sept. 21, 1927, p.34.

[7] Before Am. Pet. Inst., Chicago, Ill., Dec. 7, 1928.

[8] NAT. PET. NEWS, Sept. 21, 1927, p.256.

Boiler Operation and Maintenance

By L. D. Scarborough

Boiler Inspection and Insurance Co., Dallas

(Presented at the Plant Operators Meeting of the Natural Gasoline Association, at Breckenridge, Texas, April 22)

THE operation of a steam boiler used for any purpose necessitates providing a safety valve of ample size adjusted to open by the time the maximum safe working pressure of steam has been generated. The safety valve capacity must be sufficient to relieve the boiler of all of the steam generated at the maximum safe working pressure when all other outlets are closed, so it is customary with the operation of boilers of large size to use two or three and sometimes more safety valves.

The safety valve should be adjusted to open before the maximum safe working pressure stamped upon the boiler is exceeded when the boiler is new. As the use and abuse, the expansion and contraction stresses, the corrosion and leakage, as well as the deterioration of various kinds weakens the structure as a whole and its important parts, same reduction in pressure becomes necessary if the proper margin of safety is to be maintained.

The extent of the needed reduction can be determined only by one of special skill in boiler inspection and of special training and experience.

I hardly need to state that a stop valve should never be installed between the boiler and its safety valve, although it is surprising how often a connection of that kind is discovered by the inspector.

The safety appliance of importance equal to that of the safety valve is the water gauge. This gauge may consist of a water column equipped with three gauge cocks and a glass tube. The lower end of the glass tube should be above the lowest permissible water level so during the time the boiler is in operation, the water should be vis-

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ible in the glass gauge, and it is customary to carry the water from three to five inches above that point depending more or less upon the quality of the feed water used.

The gauge cocks are located within the range of the glass gauge so that the water level as high as the middle gauge cock will show at approximately the center of the gauge glass.

The extremely high pressure encountered in central station operation where 1200 pounds is no longer unusual has led to the improvement of the flat plate glass gauge lined with mica to prevent erosion. Owing to the difficulty in maintaining valve seats the gauge cocks are seldom used, but there is a water column with its water glass connected to each end of the boiler drum.

In case the water line, as shown in each of the flat gauge glasses, is not at approximately the same level and the operation of the water column blow down valves does not indicate which column is registering correctly it is necessary to take that boiler from service.

I would emphasize that, in any case where there is uncertainty regarding the correct water level, the boiler be taken from service immediately for with the high rates of evaporation we now encounter, the water may be entirely evaporated from the boiler within 15 to 20 minutes after the supply of feed water ceases.

The boiler should have two attachments, either of which should be capable of providing it with an ample supply of water at all times without operating at an excess speed. When the plant contains a number of boilers the feed pump capacity should be double the normal demand and that capacity should preferably consist of three or more units rather than to depend upon two large units to take care of the load.

While a boiler might be successfully operated without a steam pressure gauge and many of the gauges we encounter are worthless, the pressure gauge is practically a necessity and its pressure reading should compare with the safety valve setting. If the pressure gauge and the safety valve do not correspond when the safety valve is blowing it is probable the pressure gauge is incorrect. The pressure gauge should be tested immediately by comparison with one known to be correct. If an inspector's test gauge is not likely to be available an extra standard gauge should be held in reserve for that purpose.

The adjustment of the safety valve should never be changed until the correctness of the pressure gauge has been positively determined and the work should then be done under the supervision of some one with full knowledge of safety valve mechanism.

The main steam pipe valve must be located as near as possible to the boiler and each branch steam pipe should likewise have a stop valve at its junction with the main steam header. It is customary to provide two main steam pipe valves near the boiler, with a bleeder pipe and valve between them.

The design of the main steam header should provide gravity drainage toward the boiler and toward the header from the stop valves, thus avoiding pockets in which water of condensation may accumulate. If a water pocket is unavoidable it should be provided with a drain connected to a drain trap. The water pocket drain which is operated by hand should not be depended upon.

The first duty of the attendant, upon entering, the boiler room upon the change of shifts, is to find out where the water level is in the boilers. Neglect of this precaution has caused many accidents, and ruined many boilers.

If there are valves on the pipes connecting the water-column with the boiler, make sure that they are sealed open. Then open the mud valve at the bottom of the water-column, letting the water blow out freely for about one minute, so that the column may be thoroughly flushed. Then close this valve and open the pet cock at the bottom of the glass gage, letting water and steam blow out for some time, so that the gage connections may be well flushed. Blow out the column and the glass in this way, alternately, several times, to make sure that everything is in good order. See that the water returns to the glass gage freely. The entire operation here described should be repeated several times a day, or on each shift of the attendants.

In preparing to get up steam after a boiler has been out of service, great care should be exercised in making the manhole and handhole joints tight.

Never use lead gaskets after they have become thin and hard, and avoid all gaskets of other metals, unless they are corrugated or soft and pliable. It is difficult to make a tight joint when using a hard gasket, without setting up the cover-plate bolt with great force. Bolts and cover-plates are often cracked by the severe strain thus thrown upon them. A leaky handhole or manhole plate gasket will cause corrosion and expensive repairs.

In using gas or oil fuel, the greatest caution should be observed, before lighting the fire, to see that the drafts are open for a sufficient length of time to remove any gas that may have accumulated in the setting. Never turn on the fuel supply when starting up, nor after the snapping out of a burner without first introducing a lighted torch, or a piece of burning waste, into the furnace. Disregard of these precautions is likely to result in a serious accident.

When a boiler is fired up after having been out of service for a time, extreme care should be taken in cutting this boiler in with others that are already in service, and communicating with the same steam main. It is a more or less common (though highly dangerous) practice, to cut in the boiler as soon as the pressure upon it comes within 10 or 15 pounds of that prevailing in the steam main at the time. This should never be done. Many fearful explosions have resulted from management of this kind. In cutting in a boiler with others it is of exceeding importance to be sure that the pressure upon it is as nearly identical as possible with the pressure that is prevailing, at the time, in the steam main.

When the equality is judged to be exact, the stop-valve of the boiler that is to be cut in should be opened very carefully indeed, just a bare crack at first, and then, as the slight outstanding difference of pressure equalizes itself, opened wider, very slowly, until it is open full. The complete operation should occupy a couple of minutes or more, and the attendant should hold himself in readiness, at every instant,

Ethylized Gasoline OK'd in Britain

LONDON, April 15.—In the interim report of the British Departmental Committee on Ethyl Gasoline, issued in July, 1928, the view was expressed that there were no good reasons for prohibiting the use in the United Kingdom of that mixture as a fuel for automobiles, provided its distribution and use were suitably controlled, and this view has been confirmed in the unanimous final report just issued in London.

In summarizing its conclusions the committee states that the use of ethyl gasoline as a fuel would not increase the proportion of particulate lead in the atmosphere of the streets to such an extent as to constitute a risk to the health even of that part of the population which is most exposed—namely, police officers on traffic control duty and drivers of automotive vehicles.

The committee does not recommend any legislative action so long as the terms of the contract between the proprietors of the fuel and the distributors in Britain secure the continued observance of the following precautions:

(1) That cans and pumps should be labelled to indicate the presence of lead in the fuel and to warn the user to avoid spillage and not to use the fuel for other purposes than motor fuel;

(2) That the fuel should be dyed as an additional check against its use otherwise than as auto feul; and

(3) That the amount of lead tetraethyl in the fuel sold for ordinary commercial purposes should not exceed one part in 1,300 parts by volume or about one in 650 by weight.

to close the valve at once, if there is the slightest evidence of any unusual jar or disturbance of any kind.

In general, boilers should be blown down at least one gauge daily, though no fixed recommendation can be made in this respect, that will apply to all the widely varying conditions of water and of duty required of the boilers. When the water is bad, and the duty of the boiler is heavy, the blowoff should be opened oftener. When the feed water carries a large amount of scale-forming matter and considerable quantities of scale solvent are used, blowing should be frequent, fresh water being fed into the boiler to take the place of that so removed.

Temperature and Pressure Controlling Devices

(Presented by E. H. Triphaus, Taylor Instrument Co., before Plant Operators Meeting of the Natural Gasoline Association, at Breckenridge, Texas, April 22)

THE manufacture of natural gasoline is fundamentally based on temperature and pressure conditions, and any improvements bringing about increased efficiency and greater economies are intimately linked with the degree to which these two factors are held under control.

Progress in natural gasoline manufacture has entailed a corresponding improvement in the products of the instrument manufacturer to meet the new needs. . . . the resourceful manufacturer has made available a line of dependable equipment complete for every gasoline plant requirement. . . .

The growing use of automatic controls represents a tremendous step forward in the development and perfection of the ideally operated gasoline plant. The indicating thermometer and pressure gage will tell *what the condition is*, and the recording thermometer and pressure gage will tell *what the condition was and is* once the instrument is set for the desired temperature or pressure factor.

The application of temperature regulators in absorption plants is evidenced principally in the control of temperatures of distillation and of fractionation. In the stripping still, or evaporator, whether gas fired or steam heated, the temperature regulator is a safeguard against overheating with the attendant volatilization of the absorption oil, overloading the knockout box and the production of high endpoint or off color gasoline. As a preventive of unduly low still temperatures, it is an insurance against the improper stripping of the oil, lowering the absorption capacity of the lean oil, and low production. . . .

Efficient stabilization or fractionation is made possible by the application of temperature controls to the kettle and top of the fractionator column. Operating specifications are so close in this process that a variation in temperature of only a few degrees has a vital effect in the quality of the finished product. The stabilizer in great part owes its superiority over the old system of weathering in the degree to which the factor of temperature can be held under control.

Experience has proven the desirability for automatic back pressure control on accumulator tanks in compression system as an aid in securing uniformity of production and smoothness of operation of the compressor plant. This application has proven one of the most important features of plant operation, not only in its benefit to the plant itself, but also in the gas lift system of oil production, where the gasoline compression plant furnishes the high pressure gas needed for the flowing of the wells. Back pressure regulation on accumulators or at the compressor plant discharge maintains constant head pressures for gas lift operations, a factor on which successful application of this system of oil production is partly dependent. . . .

In stills or knockout towers operating under pressures the back pressure regulator will prevent surging, overloading the knockout tower or the production of off-color gasoline, thus insuring the uniformity of quality in the condensate and consistency in absorption plant processing.

The application of the back pressure regulator to high pressure gasoline fractionators is also a leading contributory factor to the remarkable success which this comparatively new gasoline plant unit has met. When it is recognized that, even under constant temperatures, pressure fluctuations can cause a condition of flooding in the fractionator, the loss of the valuable constituents through the outlet gas line, or a condition of incomplete fractionation, the back pressure regulator becomes a vital factor in the production of uniform stabilized gasoline and the maintenance of standard plant output.

Two general classes of regulators are the so-called self-acting and pilot operated types. The term self-acting is applied from the fact that no outside motive force is required for the instrument's operation.

The pilot operated controller represents the most improved development in instrument manufacture, and is gradually coming to be standardized upon in the important phases of gasoline plant work. It provides that element which is conducive to close regulation on applications where a few degrees or a few pounds variation in temperature or pressure may result in considerable loss or disastrous condition upsets. The operation of the instrument requires an outside motive force which may be either compressed air at 15 to 25 pounds pressure, or the dry residue gas from the plant itself under the same pressure.

The copper instrument for the particular application is dependent on various factors, such as the actual temperature to be controlled, the desired range of the controller, the distance between the instrument and the location and the point of application of the bulb member, or similar facts which influence the selection of the recorder.

The success of any control installation in a natural gasoline plant, whether temperature or pressure, is dependent to a great extent on the proper selection and construction of valves. Manufacturers of temperature and pressure controlling regulators must necessarily have as complete information as is possible to secure. Realizing, however, the variation in flows, capacities, etc. in your industry we desire to play safe and specify valve sizes amply large to take care of any contingencies. If you have a two-inch line, and are only using approximately one quarter or half the capacity of that line, you will not secure the best control possible with an automatic regulator of either temperature, or pressure. It is hoped that some time in the future it will be possible to overcome this difficulty by making provision in the construction of diaphragm valves to compensate for these variations in the natural gas industry.

There is hardly a process in gasoline manufacture that operates on temperature or pressure and is adaptable to automatic control regulation that cannot be controlled from a selection of instruments from these that have been described.

In each particular case the application of indicators, recorders, and controllers must be considered so as to select the proper fittings and devices to make the installations more serviceable. It is only by investigating the construction principle of operation, the care in inspection, calibration and testing of the various instruments that confidence and satisfaction from their operation may be assured.

Rebuilt Cracking Units Operate 500 Hours Without Coke Formation

By Arch L. Foster
N. P. N. STAFF WRITER

SAN ANTONIO

REVAMPING the topping and cracking units of the Grayburg Refinery here is the job that was undertaken less than two years ago when this plant was taken over by its present management. Much of the equipment of the plant was obsolescent either in design or in method of operation.

The management did not wish to spend large sums of money to practically build a new plant, yet was faced with the necessity of putting the plant on a more paying basis, with a minimum expenditure of cash. How this was successfully accomplished and the details of how one portion of the work was done are given below.

The topping plant was modernized by the installation of a tube still and bubble tower, the latter essentially the design of the management. This installation now delivers end point gasoline overhead without rerunning, sending the remainder of the crude to the cracking stills without separating intermediate products. This unit has been completed very recently, and the details will be given in a later article.

The plant at present operates on a mixture of crudes from Darst Creek, Somerset, and West Texas fields, proportions of the mixture varying widely from time to time. The cracking units in the plant were Dubbs of the older type, and the results obtained were not satisfactory in the light of more recent improvements in the cracking art.

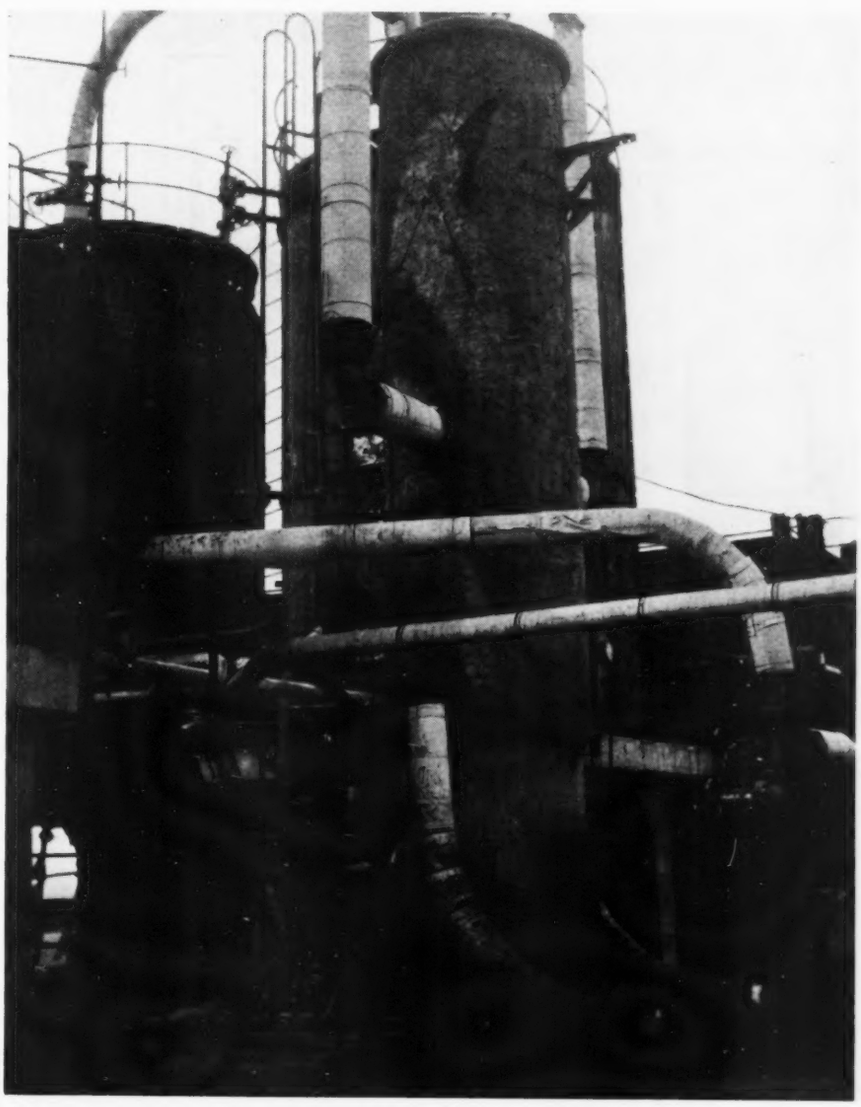
Due to the high sulfur content of the crudes, as well as the presence of troublesome amounts of chlorides, especially of magnesium chloride, the corrosion of the equipment was high, and the periods "on stream" were short. Replacements of still tubes and condenser sections were frequent and expensive. To large a percentage to time was spent in making these replacements.

Under the older system the amount of coke formed was high, and the disposal of it in this land of perpetual summer was not easy or profitable. On the other hand the market for fuel oil was comparatively good, provided the fuel did not give trouble from excessive amounts of carbon settling out in storage or use.

Frank Hovell, manager and John Bell, plant superintendent, rebuilt the plant according to a new design by the Universal Oil Products Co. They also reorganized the operation to produce a marketable fuel oil and motor fuel of high anti-knock rating, producing other commodities only for special purposes and on special order. The ingenuousness of the plan they worked out for practically eliminating the formation of coke and separated carbon, the combination of the two cracking units into one unit using a common flash condenser, with consequent saving in cost of equipment, and the operation of the whole to reduce overhead to a low minimum will be given in detail.

To each of the old units a new reaction chamber was added, insulated in the regular way by rock wool. Each old reaction chamber was converted into a flash chamber, where the liquid residuum from the new chamber is flashed as explained later. These four chambers are connected so that one might be cut out of the system for cleaning or repair without shutting down the units.

Instead of a flash condenser separate for each unit, the flash vapors from both flash chambers are led to a common flash condenser through 6-



Flash condenser used by both units. Cold feed line enters near center

inch lines insulated with double thicknesses of 85 per cent magnesia. This flash condenser is of the conventional design and needs no explanation. Any vapors passing off from this condenser are carried through a 3-inch line to, and condensed in, a 120-foot coil of 2-inch pipe set in the main condenser box.

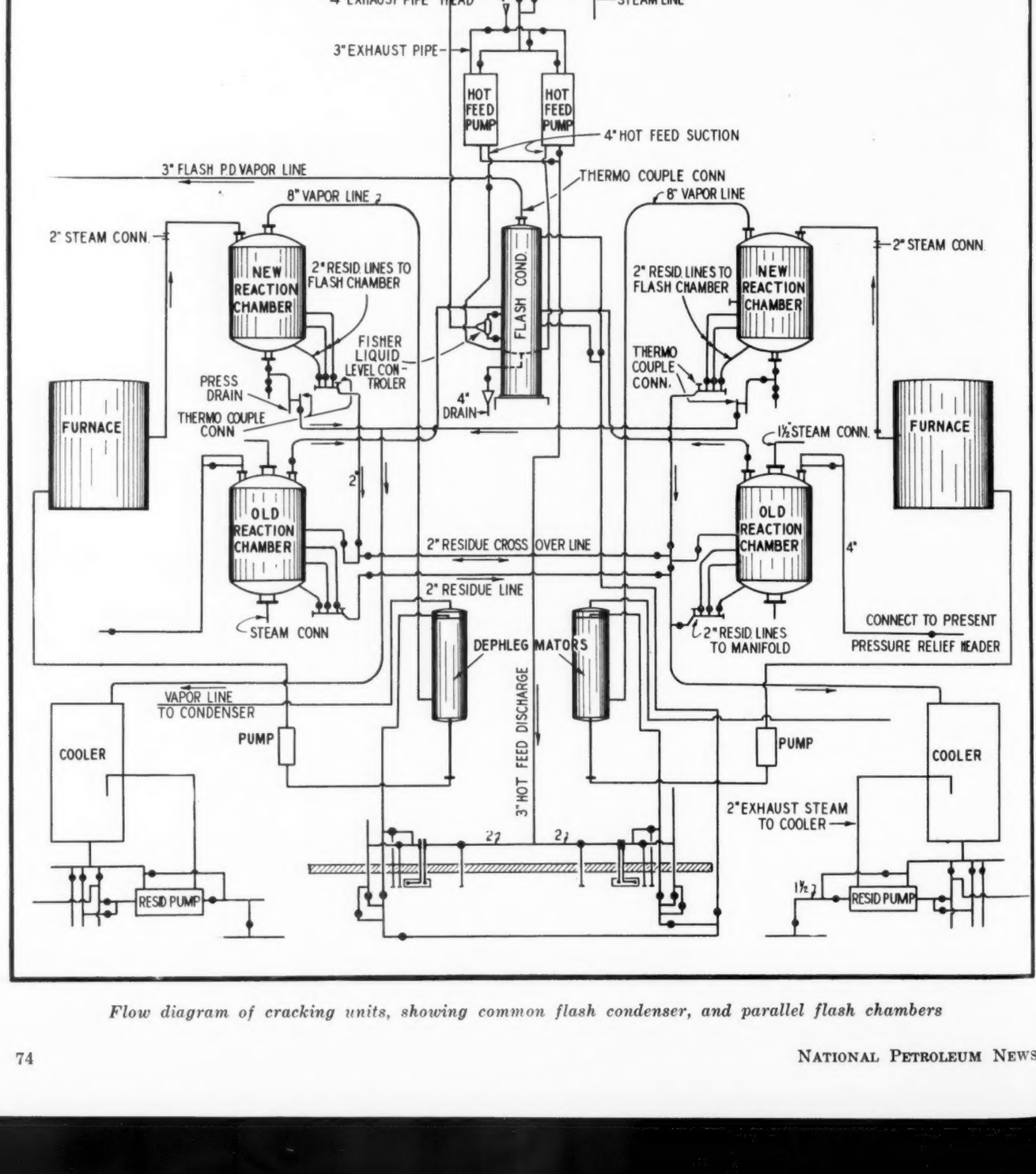
Operation Of Plant

Topped crude from the skimming plant is pumped through a 2-inch line into the top of the flash condenser at a rate of 2700 to 2800 barrels per day. The crude is treated in the topping unit with sufficient ammonia and caustic soda to counteract the corrosion taking place in that still. On entering the cracking system it receives a treatment of lime of 0.6 pounds per barrel. In the flash condenser the charge meets and condenses the vapors from the flash chamber, as under present operation no distillate is obtained overhead from this condenser.

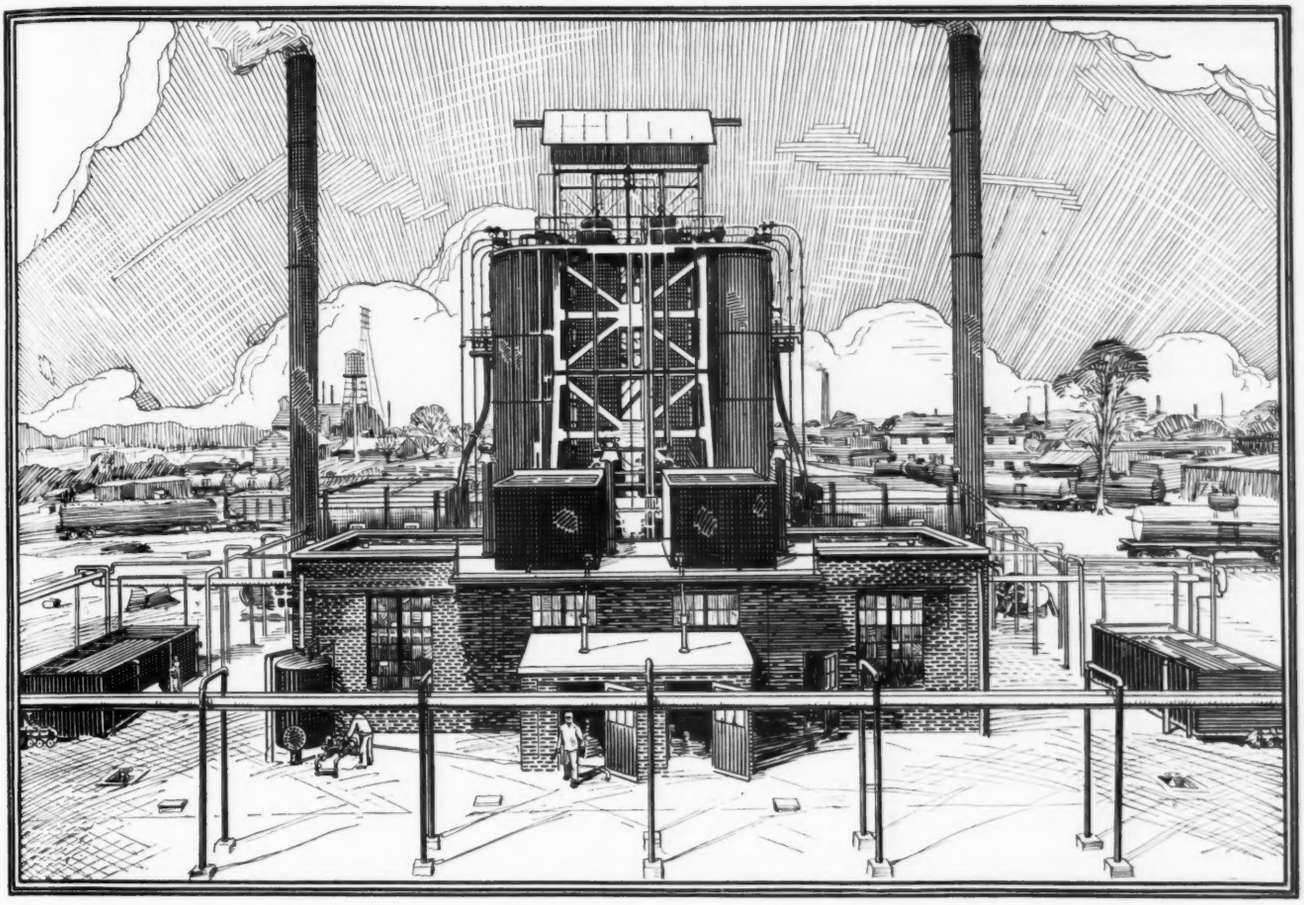
From the base of the flash condenser the combined topped crude and recycle stock from the flash chamber is picked up at 385 to 400 F. by the hot oil pumps and sent through orifice meters which divide the charge to each of the dephlegmators where the heavier vapors from the reaction chambers are condensed and added to the charge, and the charge receives additional preheat. The preheated charging stock is pumped from the bottom of the dephlegmators to the two pipe stills, reaching the tubes with a temperature of 750 to 770 F, and pressure of 250 pounds.

Leaving the tubes at a temperature of 890 to 910 F. and 190 pounds pressure the oil passes to the new reaction chamber from which the vapors are conducted to the dephlegmators at 840 to 850 F. and about 170 pounds pressure, are refluxed by the incoming charge, the fractionated vapors passing to the condensers at 530 to 540 F. and into the P. D. rundown tanks.

It is at this point that the method of operation to prevent the formation of coke and undesirable amounts of suspended carbon was instituted. The liquid oil in the bottom of the reaction chamber is removed as fast as it collects there, the level being maintained at only one to one and one-



Flow diagram of cracking units, showing common flash condenser, and parallel flash chambers



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half inches. Passing from the chamber to the outflow manifold, this unvolatilized oil is mixed continuously with about 100 gallons of P. D. bottoms per hour, shock-chilling the oil, reducing its viscosity and aiding in preventing the formation of suspended carbon which settles easily in storage.

From the reaction chamber at a temperature of around 760 F. this chilled oil passes to one of the flash chambers (only one chamber being used at a time for this flashing), where the pressure is reduced to substantially atmospheric, and the liberated vapors passing as recycle stock to the flash condenser as previously described.

Bottoms from this chamber are then pumped at a temperature of approximately 675 F. through a manifold and is again mixed with 100-150 gallons per hour of P. D. bottoms to further minimize the carbon formation. After passing through the cooler coils still another "shot" of P. D. bottoms is added.

This treatment, the operators have found, yields a fuel oil which does not settle out objectionable amounts of carbon, is more serviceable as to viscosity, and commands a premium price in the market. The gravity of the still bottoms is originally 10.0 to 11.0 A.P.I. and after cutting with P. D. bottoms is approximately 15.0 A.P.I.

In spite of the pre-treatment of the charging stock the corrosion of tubes and equipment is comparatively heavy in fact under present operation the length of time "on stream" is determined, not by coke formation or the necessity of cleaning, but by the necessity felt by the operators for inspecting the units for thin tubes and other dangerous results of corrosive action by the charging stock. The operators state that the amount of coke found in reaction and flash chambers is negligible, and the runs could be continued indefinitely if it were not advisable to make frequent inspections of tubes, etc. The longest continuous run yet recorded was 521 hours, and shut down then was only for the purpose of inspection.

Regular shutdowns are now made after approximately 400 hours of running, whereas under previous conditions one day in four was occupied in cleaning coke and inspection of equipment. On shutting down the units, all still tubes are gauged, all valves are repacked, all joints inspected and repacked if any indication of leakage is observed.

An arbitrary wall thickness for tubes has been adopted, and all tubes showing thinner wall than that at any joint are immediately replaced. In many instances return bends are so corroded as to make replacement necessary, so heavy is the corrosion here, This system of careful inspection results in an exceptionally clean plant.

Tubes of several types and materials have been tried out in these stills, but as yet no final decision has been reached as to the material most suitable for resisting the action of the charging stock. Special steels, calorized tubes, and Enduro 18-8 tubes are being tested side by side in different parts of the furnace, and each have shown certain advantages, as well as different shortcomings, and the experimentation is being continued. According to data obtained, the tubes lose 1/128 inches in thickness per 2 days of operation.

One interesting feature of operation is the method of cooling the hot oil pump packing. Topped crude from the charge tanks is pumped into the packing glands at a pressure somewhat higher than that developed in the hot pump cylinder; the packing is so arranged that this cooling oil passes through into the pump cylinder and becomes a part of the charge to the still; thus fresh oil is used continuously to cool the pump. About 150 to 160 gallons per hour are used, the cooling in this manner being very effective.

Under this system of operation with this design of plant, the average throughput of the cracking plant has been increased by about 40 per cent over that obtained under previous methods of operation. At the same time the quality of the motor fuel has been increased especially for anti-knock value, the grade of fuel oil has been improved and the installation cost and overhead for a plant of similar capacity has been materially reduced. Viscosity of the fuel oil has been reduced from over 2000 seconds Furol at 122 F. to 20-25 seconds at 122 F. Regular products from the plant consist only of gasoline and fuel oil. Motor fuels of varying specifications are manufactured for different customers, and a special, non-premium gasoline, with a knock rating of 45-52 per cent "benzol equivalent" is sold through the company's service stations. Special products, such as tractor distillate, to supply local demands, is made from time to time, but is not a regular product of the plant.

Properties Of Products

The mixture of crudes as charged to the topping still varies in gravity from 31.0 to 35.5 A.P.I. and in straight run gasoline content from about 25 per cent to 33 per cent or more. The charging stock to the units also varies with the mixture of crudes; a representative stock is as follows.

Table 1.

Cracking Still Charging Stock	
Gravity	22.5
Initial Bl. Pt.	477 F.
2% off at	500 F.
9% off at	550 F.
Sulfur	2±%

The pressure distillate as it comes from the condensers, representing 68 to 70 per cent of the charging stock

shows a typical distillation as follows, column I, Table 2.

Table 2

	Pressure Distillate I	Rerun Cracked Distillate II
Gravity, A.P.I.	48.3	57.5
I.B.P.	104F.	95F.
10%	180	154
20	233	183
30	276	.....
40	320	.....
50	356	262
60	390	.....
70	418	.....
80	440	.....
90	486	368
End Point	538	423
Recovery	95.5%	

Rerun cracked distillate, before treating, shows a typical distillation curve represented by the data in column II, Table 2.

Table 3

	Straight Run Gasoline	Anti-knock Gasoline
Gravity, A.P.I.	58.4	58.6
I.B.P.	102F.	97F.
10%	180	154
20	214	196
30	242	228
40	264	252
50	284	274
60	300	296
70	316	315
80	338	340
90	362	370
E. P.	405	415

In the treating of the pressure distillate it is first washed with 450 gallons of 20 degree caustic solution per 35,000 gallons of pressure distillate. This is done under 25 pounds pressure on the way from the Dubbs stills to untreated distillate storage through Schutte & Koerting ejectors and settling in horizontal towers which serve as a reservoir for the caustic.

According to the operators this preliminary caustic treatment removes the hydrogen sulfide produced and lessens the amount of acid and doctor solution necessary for treatment.

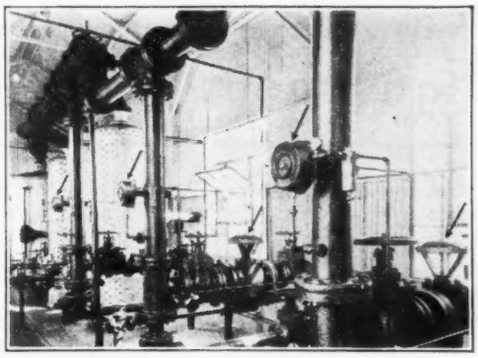
The pressure distillate treatment consists of 3½ pounds of acid per barrel introduced through a Paragon mixer head followed by caustic neutralization through another Paragon mixer. This treated pressure distillate is then rerun and the overhead gasoline doctor treated.

The straight run gasoline is treated with 3 pounds of acid per barrel through a Paragon mixer, water washed and treated with revivified doctor solution and a small amount of sulfur. When sweet a few pounds of sulfur are added to the gasoline and doctor solution and blown for five or ten minutes for a "break."

This procedure lessens the total amount of sulfur required for treatment and it was found to materially decrease the sulfur content of the finished gasoline. Treatment goes on more smoothly, settling is better, and more rapid; the quality of treated gasoline is higher and better control of

Tycos

Temperature and Pressure Regulators in Natural Gasoline Plants



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give absolute control over the two vital factors upon which the science of the industry is based.

Through the control of temperature in the stripper still, dephlegmator tower, "kettle", and top of the gasoline fractionator . . . through the control of back pressures in absorbers, accumulators, stills and gasoline fractionators, etc., *Tycos* Temperature and Pressure Regulators enable the operator to maintain desired production and control the quality of his final product within very close limits.

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Built to last... you will always be assured of a fresh supply of pure water, when you have a GOTT Water Cooler. *Order one now from your supply store.*

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KEEP PURE DRINKING WATER ALWAYS HANDY

treating the everchanging gasoline stock is possible.

Straight run naphtha, cracked gasoline and natural gasoline are blended in such proportion as to produce a motor fuel of the desired starting and anti-detonating properties. Usually the gravity of the straight run and cracked naphtha blend is about 56 to 57 gravity an is brought up to approximately 58 A.P.I. with natural gasoline.

The total yield of motor fuel from the crudes charged is 50 to 51 per cent, the greater portion being marketed through the company's retail stations in central and southwest Texas.

New Equipment

Oxweld Acetylene Co., 30 East 42nd St., New York, has developed another new blowpipe, its type W-17, which is a full sized device, large enough for any welding job and designed and constructed so that it may be used for the finest of welding craftsmanship, the company claims.

New principles incorporated into this blowpipe include a tip and welding head of one piece construction, injector and mixing chamber for each of the ten welding heads and a nut on each welding head for attaching it to the handle of the blowpipe. A fire pitch thread makes it possible to tighten or loosen the nut easily without the use of a wrench.

The inner cone of the flame of this type blowpipe is different in that it is shorter and thicker and has a tendency to assume the shape of a ball at the end. This speeds up the rate of welding because a larger portion of the high temperature flame surface is brought closer to the metal, according to the company.

* * *

The International Derrick & Equipment Co., Columbus, O., has opened an office at Pittsburgh, Pa., in the Grant Bldg. It will be in charge of James H. Dye, district manager

* * *

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has off the press Leaflet 20455 describing and illustrating its twin-motor and single-motor oil well drilling equipment. This equipment for cable tool drilling is furnished in both open or gas protected types. The latter type, for use where gas is present in explosive quantities, provides complete protection from sparking in motor and control, the control contacts being immersed in oil and the collector ring assembly of the motor being mounted in an explosion proof housing outside the front bracket of the motor.

* * *

Haynes Stellite Co., Kokomo, Ind., a unit of the Union Carbide & Carbon Corp., has published a booklet devoted to properties of Haynes stellite alloys. It includes a general description of these alloys, an explanation of red hardness, the uses, physical and chemical properties and structure of these alloys.

* * *

Sterling Motor Truck Co., Milwaukee, has announced through its vice president and general manager W. B. Hambly, that new Sterling trucks registered in California in 1930 exceeds the previous year by 29 per cent.

* * *

The United States Air Compressor Co., Cleveland, is introducing to service station and garage owners a new series of car lifts, one of which is a full hydraulic, oil-locked lift, another a free-wheel type and a third and fourth type of the drive-on type.

The new full hydraulic type of lift which is known as series "A," is made in both the drive-on and free-wheel type. Safety, R. L. Bacher, president, says, is the most important consideration in the manufacture of these lifts.

The lift is supported on a column of oil, tending for safety. By a turn of a valve, the car is raised to the desired height where it is then automatically oil-locked and cannot be lowered until the operator deliberately presses and holds down the foot valve. In lowering, it can be stopped instantly by simply releasing the foot valve. The oil under the piston cannot escape faster than a speed determined by a retarding vent.

Another feature is the construction of the cylinder which projects slightly above the floor or ground line, eliminating the chances of water getting on the piston and causing rust or corrosion. Other features are described fully in bulletin 27 which the company has published on this new lift.

* * *

The Autocar Co., Ardmore, Pa., has appointed E. F. Sayers to assistant sales manager in charge of branch operations, according to H. M. Coale, vice president in charge of sales. The company has 50 direct factory branches.

* * *

The Connersville Blower Co., Connersville, Ind., is adding space to its factory buildings to house the production of its Victory rotary positive blowers and gas pumps and Connersville meters of the smaller capacities which are applied in the combustion in oil or gas burners, aeration and agitation of liquids, and so on.

* * *

Universal Pump & Tank Corp., Cleveland, O. has embodied new features in the design and construction of its new Universal grease nozzle. An adapter device securely locks the nozzle into place. It needs no holding or attention during the greasing operation.

This nozzle fits standard sized hose and is available for replacement or as a standard part of new grease dispensing equipment.

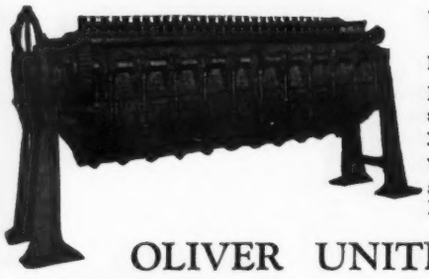
* * *

Tube-Turns, Inc., Shelby St. and Goss Ave., Louisville, Ky., which claims to be the only company making stock fittings for pipe welding, has taken space in various trade papers to call attention of engineers and users of pipe fittings to the book it has published on these stock fittings for oil and process industries.

This book tells of the strength, safety and economy of Tube-Turns for making changes in direction of oil and process piping. The book shows how and why Tube-Turns are being used by oil companies controlling 80 per cent of the country's production, and contains dozens of illustrations showing actual installations.

The company claims that there is no thinning of the outside wall, no buckling of the inside wall and no flattening of the cross section; that there is free flow, strength, light weight, co-efficient of expansion and contraction same as pipe, and tight joints.

Worth Emphasizing—"Customer Insurance"



YOU may run along day after day without any contamination of your lube oils.

But what if one shipment goes out with some dirt in it? That one lot may cost you that customer's business.

Why not prevent any such development arising? Put in the special Sweetland Pressure Filter.

OLIVER UNITED FILTERS INC.

SAN FRANCISCO, Fed. Reserve Bank Bldg. NEW YORK, 33 West 42nd St.
CHICAGO, 565 Washington Blvd. LONDON, W. C.1, 150 Southampton Row
PARIS, 63 Ave. des Champs Elysees
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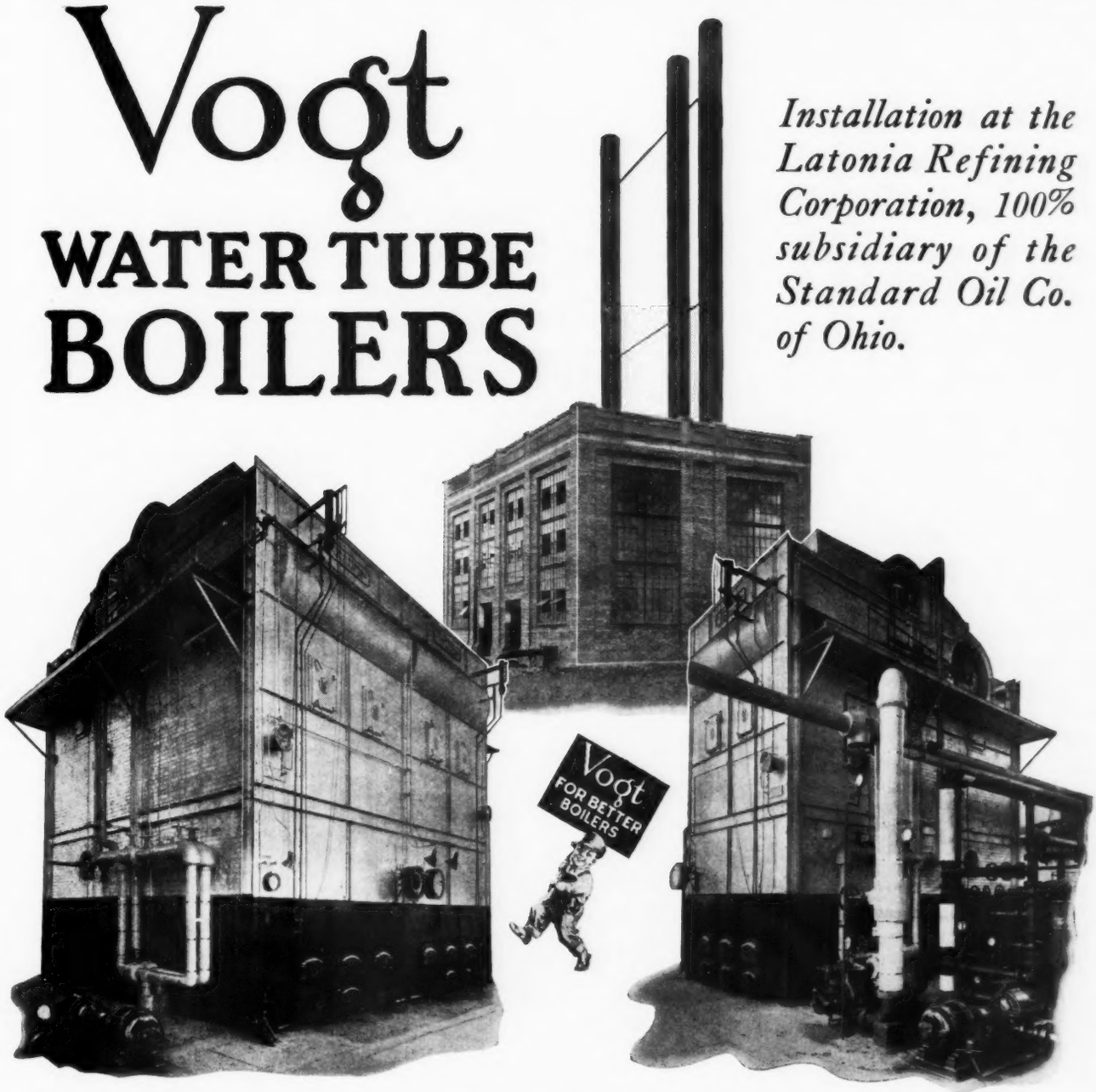
REFINERS ARE AMONG THE LARGEST USERS OF

Vogt WATER TUBE BOILERS

Installation at the Latonia Refining Corporation, 100% subsidiary of the Standard Oil Co. of Ohio.



Three 400 horse power four drum boilers, two in battery setting, deliver steam superheated as much as 30 deg. at the Latonia Refining Corporation, Latonia, Ky. Besides eliminating line and cylinder condensation, this slight superheat also eliminates carrying in suspension highly abrasive particles so injurious to valves, cylinders, turbines, etc. The above is one of many reasons why the Vogt four drum boiler is particularly suited to refinery service.

HENRY VOGT MACHINE CO.
INCORPORATED
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Filter Presses — *Wax Moulding Presses*
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Complete Wax Plants designed and built
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FACTS

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3 Saves Vapor Losses
4 Leveling Features, Assuring Ideal Operation
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6 Low Maintenance Costs
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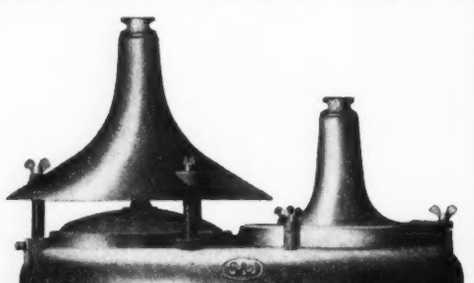
8 Mercury Seal or Metal to Metal Seat



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Tulsa, Okla., 216 E. Brady St.
Los Angeles, Calif., 530 W. 6th St.
Ploesti, Roumania, Strada Golesti No. 9

New Patents

Prepared by R. E. Burnham, patent and trade-mark attorney, 1343 H Street, N. W., Washington, D. C., from whom copies may be obtained at the rate of 20c each. State number of patent and name of inventor when ordering.

MISCELLANEOUS

Gear-lubricant-testing machine — Carl L. Knopf, Chicago, Ill., assignor to Sinclair Refining Co. No. 1,748,471.

Gear-lubricant-testing machine — Carl L. Knopf, Chicago, Ill., assignor to Sinclair Refining Co., New York, N. Y. Filed Aug. 18, 1928. No. 1,748,512.

Liquid-vending machine—Francis I. du Pont, Wilmington, Del. Filed May 27, 1924. No. 1,748,513.

April 2, 1930

PRODUCTION

Drill—Thomas Grant, Gillespie, Ill. Filed June 28, 1928. No. 1,752,524.

Jack-frame for well-pumps—Joseph R. Mahan and John B. Picard, Toledo, Ohio, assignors to National Supply Co., same place. Filed Jan. 30, 1928. No. 1,752,647.

Fishing-tool—Ferdinand J. Spang, Butler, Pa. Filed Oct. 2, 1928. No. 1,752,656.

Fishing-tool—Winfield S. Jones, Brea, Cal. Filed June 4, 1928. No. 1,752,669.

Apparatus for pumping liquids—Frank A. Hatfield, Los Angeles, Cal. Filed May 22, 1928. No. 1,752,739.

Formation-sampler—Gerald A. Poole and Scott G. Forney, Fort Worth, Tex., assignors to Gulf Production Co., Houston, Tex. Filed Apr. 20, 1929. No. 1,753,066.

Trip casing-spear—Godefridus H. C. van Keulen, The Hague, Netherlands. Filed Sept. 17, 1928. No. 1,753,074.

MISCELLANEOUS

Illuminating oil and process of making same—Frank W. Hall, Port Arthur, Tex., assignor to Texas Co., New York, N. Y. Filed Jan. 9, 1926. No. 1,752,299.

Liquid-measuring pump—Earl E. Eickmeyer, Dayton, Ohio, assignor to National Recording Pump Co., same place. Filed Jan. 9, 1925. No. 1,752,523.

Liquid-dispensing arrangement — William S. Townsend and Walter H. Parker, Rochester, Pa., assignors to Wayne Pump Co., Baltimore, Md. Filed Feb. 19, 1926. No. 1,752,934.

Liquid-dispensing apparatus — Andrew W. Cleary, Rochester, Pa., assignor to Wayne Pump Co., Baltimore, Md. Filed Apr. 7, 1927. No. 1,752,941.

April 8, 1930

REFINING

Art of cracking hydrocarbons—Edward W. Isom, Scarsdale, N. Y., assignor to Sinclair Refining Co., New York, N. Y. Filed May 25, 1927. No. 1,753,432.

Process and apparatus for treating petroleum oil—Arthur G. Bogardus, New York, N. Y., assignor to Universal Oil Products Co., New York, N. Y. Filed Jan. 30, 1925. No. 1,753,769.

Level-indicator for mineral-oil stills—Arthur E. Pew, Jr., Bryn Mawr, Pa., assignor to Sun Oil Co., Philadelphia, Pa. Filed June 19, 1925. No. 1,753,803.

Treatment of fluids with solid substances (refining hydrocarbon oil)—Thomas T. Gray, Elizabeth, N. J., assignor to Gray Process Corporation, Newark, N. J. Filed Jan. 18, 1926. No. 1,753,859.

Apparatus for recovering gasoline solvent—Anton L. Dorfner, Philadelphia, Pa., assignor to Baeuerie & Morris, Inc., same place. Filed Jan. 25, 1927. No. 1,753,881.

Filtering mineral oils—Donald L. Naef, Wood River, Ill., assignor to Standard Oil Co. of Indiana. Filed March 27, 1929. No. 1,753,900.

Dehydration of oil and water emulsions—John M. Cage, Los Angeles, Cal., to Dehydrators, Inc. Filed Sept. 1, 1927. No. 1,754,009.

Apparatus for breaking up petroleum emulsions—John D. Brady, El Dorado, Ark., assignor to Brady Process Co., same place. Filed Dec. 18, 1925. No. 1,754,079.

Process and apparatus for converting heavy hydrocarbon oils into lighter products—Francis S. Woidich, Sapulpa, Okla. Filed July 8, 1924. No. 1,754,136.

ADVERTISING PAGES REMOVED

Mrs. W. P. Swygert, another service station operator, who uses plenty of flowers and shrubs at her station as an aid to draw gasoline customers This station is in Columbia, S. C.

Letters Invite Women to Station To See Flowers and Shrubbery

By S. M. Levy

MORE women should manage service stations. The thought came to me as I stopped before the flower-fronted station of Mrs. W. P. Swygert, on the corner of Hampton and Hardin Streets, Columbia, S. C. It was strengthened as I shoved in the brake before the Moss Grove Station, about 12 miles out of Charleston, S. C., in one of the most picturesque locations for a battery of gasoline pumps I have ever seen.

Moss-hung trees formed a perfect archway for the station.

The rest rooms were large, airy and clean.

Mirrors, fresh linen towels and talcum powder were provided, free of charge. In the women's rest room were lounging chairs.

I became convinced of my first thought when I talked to Mrs. MacMillan, in her office above the handsome MacMillan & Cameron garage, in Wilmington, N. C.

It was a rippling, singing fountain of cool water that caused me to turn into the broad driveway of that neat station—one of the seven or eight MacMillan and Cameron places in Wilmington, N. C.

Surrounding the fountain were clumps of spirea and begonia. In the bubbling overflow basins of cascading water were miniature ferneries, cool and refreshing beneath the hot Carolina sun.

Farther up the street was another cream and green station, which I recognized at once as another of the MacMillan and Cameron chain. An otherwise undistinguished "lube ramp" was flanked on three sides by shrubbery—a mixture of barberry and what appeared to be Japanese honeysuckle. Shrubbery hid the fence and several unsightly buildings at the rear of the lot. The station itself was the picture of neatness. No clutter of signs, no grease rags, no oily driveways.

And yet sales appeal was not sacrificed for beauty. One entire wall bore the name of a well known motor oil, another the name of a well advertised gasoline. A huge painted bulletin at the side advertised the service. A tire was placed out front where its tread could be inspected and felt. Soft drinks were on sale and advertised. Two motor oil charts hung inside the doorway. One window was filled with specialties, the other with two tires and well-arranged display material. Road maps were available.

"You see, I want women to feel at home in the MacMillan and Cameron stations," said MacMillan, when I saw her later. "For, although most men don't believe it, women are a great and growing factor in gasoline sales."

When a new station opens, or on special days, bouquets of daffodils and narcissus, and sometimes small bottles of narcissus perfume, are given to women patrons. At the opening of one station, 1000 women received bottles of this fragrant scent. Many of the flowers given away are grown in colorful array right at the stations themselves.

But here again, service is not sacrificed for artistic beauty. A well

THE JOHNSON DISTRIBUTOR OPERATES ON A GUARANTEED PROFIT MARGIN

. . . the market never bothers him!

TWENTY YEARS OF QU

THE MARKET goes up . . . the market goes down . . . and with every change the unprotected Distributor gambles with his bank balance. The Johnson Authorized Distributor franchise eliminates this hazard. When the market favors him the Johnson Distributor benefits by an increased profit margin. When the market is against him . . . his margin is assured and protected. Price protection is one of several special advantages which help the Johnson Distributor build a profitable and firmly established business. Many other policies equally important safeguard and advance your interests. • To learn just why the Johnson Franchise is a better proposition for you, send for our booklet, "Today's Trends are the Forecasts of Tomorrow." It is a study of what's happening to the Distributor . . . an analysis of certain trends your business cannot escape. Send for your copy of this booklet now . . . no obligation.

JOHNSON OIL REFINING COMPANY

General Administrative Office: 178 West Adams, CHICAGO

BRANCH OFFICES & BULK PLANTS thruout Indiana Illinois, Wisconsin, Michigan, Missouri, Iowa

QUALITY . . . TIME TELLS!

ordered routine is performed. Windshields are wiped with clean cloths. Water is supplied for thirsty radiators. Free air is available for underinflated tires.

"I insist, however, on no extra flurries," continued Mrs. MacMillan, in the convincing, businesslike way of a charming woman who has carved success for herself. "The men at the various stations see what people need. If it is obvious that the windshield is dustless, no time is wasted in a make-believe shine.

"Many of the men and women who come regularly for grease jobs, or even a gallon of gasoline, want personalized service. They like Julius, or Murray, or Burt, and ask for them. For this reason the personnel is picked with utmost care. Our 'contract people' must 'measure up' to be able to give the kind of service and attention that we and our customers require. It is this personal attention that makes so many of our patrons feel at home at our cream and green stations.

"Being a woman motor car driver myself, I know that, though many women drivers know very little about the engine under the hood, they would like to understand more-especially about the gasoline and oil they must buy to keep it going. Sometimes their questions are very simple ones, such as 'Why should a motorist stick to one brand of gasoline?' or 'Why should oil be added if *only* gasoline is burned in the engine?' Sometimes the questions are quite difficult even for our mechanics to explain. But each question answered to the satisfaction of the patron means another well-satisfied customer.

"It is a blunder to assume that women do not think about the gasoline that powers their cars. Too long have they picked one brand of flour against another, chosen one make of ice-box or kitchen stove in favor of another ice-box or kitchen stove. Whether they choose gasoline because of reason, emotion, or a combination of both, just as men do, I am not prepared to say, except of the women who patronize MacMillan and Cameron stations."

The other half of the MacMillan Cameron chain is Bruce Cameron, one of North Carolina's foremost tire distributors, sportsman, owner of "Eight Bells," winner of a Frying Pan Boat Club cup.

Mrs. MacMillan did not form the original partnership. Her husband's death forced her into the business he helped to found.

The present company owes much, however, to her vision and management. Soon after Mrs. MacMillan took an active interest in MacMillan and Cameron, Inc., the largest MacMillan Cameron station was moved off the main business thoroughfare to the street behind, which is wider, less congested. Men with less foresight criticized her until they saw more and more motorists drive a block out of their way, turn easily on the broad street and enter the huge garage, or park without fear at the curb.

To get other motorists to do the same, Mrs. MacMillan and Mr. Cameron wrote them personal letters. Now, from 2000 to 3000 letters are sent out each month. Some to old customers, reminding that grease in differentials

Mrs. MacMillan, of MacMillan & Cameron, Inc., Wilmington, N. C., who gives women customers the kind of service she herself likes at service stations

and transmissions should be changed as regularly, if not as often, as oil in crankcases. Some letters are sent to new customers, explaining the extra service and telling of the good tires for sale. Some to motorists not yet customers.

The personal letters, especially, have a humorous twist and usually get results.

"Once a local baker came to one of our stations for the first time, during a snow storm," smiled Mrs. MacMillan. "It snows here in Wilmington only once in a blue moon. So I wrote him, saying that I hoped it wouldn't take a snow storm to bring him back. He has come back so often since then that I suppose he has forgotten what brought him in the first time.

"A local doctor, one of our best customers, first came because of a letter. Many women, too have been brought by letters mentioning the flowers."

What MacMillan and Cameron, Inc., have accomplished through the merchandising of their flowers, other service station operators may emulate. It is easy to prove how the addition of shrubbery to set off the lubrication pit, a box hedge around the driveway and a bed of massed flowers and a box of vines beneath the windows bring customers.

Unpainted or run down fences are easily hidden by rambler roses or common sun flowers. Unsightly walls are made sightly by planting a few "climbers" at the base. Bare spots of ground are brought to life with petunias, begonias and verbenas—all hardy, yet beautiful flowers. The spring and summer season is just at hand. A few seeds planted now will grow profits later on.

Tire Changing Might Add Another Profit to Stations

Another chore on the auto that ought to be done frequently but isn't, and that might add some revenue to the service station, is changing the tires around to get even wear.

Some oil companies offer to do this service, at a cost, and it could be worked in with the lubrication or car washing department. One jobber in Michigan will change your tires around at a charge of 25 cents a tire.

* * *

Drug Chain Offers Advertising Tip

A drug store chain operating in an eastern city got out an advertisement this spring that offers a suggestion for oil companies. The chain figured up that its managers, and assistant managers, all told had some many thousand years experience in making sandwiches, selling tobacco, toilet goods, and mixing drugs. Only employes with the company three years or more were considered in the compilation. An oil company with many old employes on the pay roll could do some figuring on its own hook and present a pretty good picture of experience.

* * *

Pick Southern Michigan If You Get Into Trouble

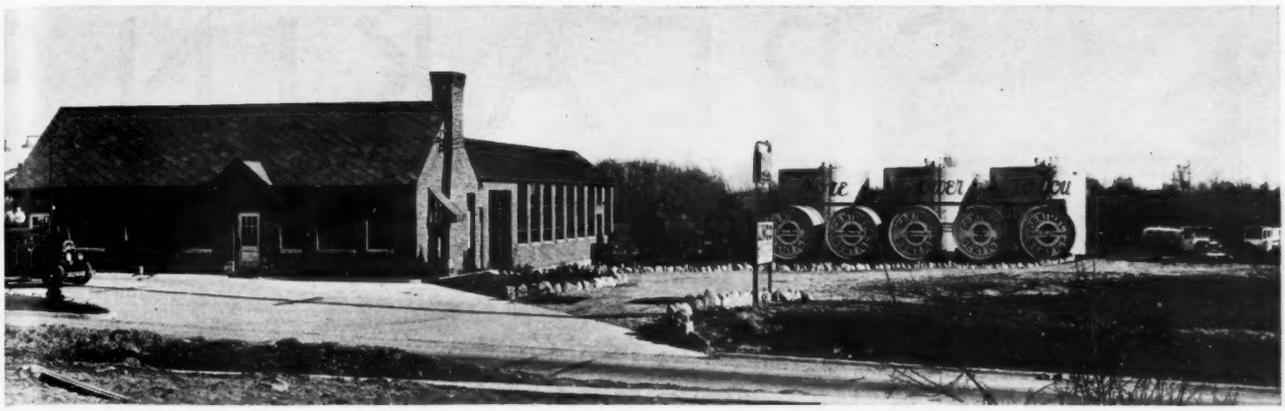
In case an oil man runs afoul the law in southern Michigan it would be advisable to do so in Ann Arbor or South Haven. When he faces "your honor" he will be greeting a fellow oil man.

Ad. D. Dubuisson, head of the Wolverine Service Stations and prominent in Michigan Oil Men's Association affairs, probably will occupy the mayor's chair at South Haven, an honor he has held several times in the past. At the recent Michigan convention Mr. Dubuisson said he hoped to win, and thought he had a good chance—there was no other candidate running.

E. W. Staebler, vice-president of the Staebler Oil Co. rules the roost at Ann Arbor.

While on the subject of politics in southern Michigan it may be recalled that Horatio J. Abbott, head of the Abbott Gasoline Co., was postmaster for many years at Ann Arbor during the administration of President Wilson.

ADVERTISING PAGES REMOVED



General view of the Central Service Co. bulk plant at Lansing, Mich. The building to the left has offices, laboratory and service station in the front; the lubricating oil warehouse is in the rear. Light oil storage is in the center, and at the extreme right, not shown in this picture, is the alcohol warehouse

Bulk Oil Tanks on Supports Provide Storage Bays for 100 Barrels

By E. L. Barringer
N. P. N. STAFF WRITER

LANSING, Mich.

SPACE has been saved in the new bulk plant of the Central Service Co., at Lansing, by placing the battery of bulk oil storage tanks in the warehouse on supports arranged so that the space underneath makes storage bays for 100 barrels.

The battery consists of 10 rectangular tanks. Each tank holds 3000 gallons of oil, and two tanks have two compartments each, allowing storage space for 12 grades.

The tanks are set about five feet above the floor. Concrete supports run lengthwise of the tanks with I beams for cross supports. Under each two tanks is a bay for storing 20 barrels of oil, or a total storage capacity of 100 barrels; thus, the usual dead space between the top of the tanks and the roof is made useful.

The bottom of the tanks drain to a draw-off valve in the lower left hand front corner of each tank. The plant has been in operation for a year, and L. D. Maxson, general manager of the company, reports that it has not been necessary to open the valves. The plant warehouse is kept at a minimum temperature of 40 degrees; steam heat is used in winter with two blowers under the roof.

At the front of the tanks, in addition to the draw-off valves, are the outlet valves and sight feed gages. Each tank and compartment has a 2-inch quick acting valve for the filling of barrels or cans. There are 12 outlets.

Each tank and compartment has a sight feed gage with a rule back of it. Employes may take inventory quickly, and keep a constant check on goods in storage, by reading the contents in feet and inches and reducing this to gallons from tables for each tank in the warehouse office.

The inlet line and the tank car unloading pump are at the rear of the tanks. Between the tanks and the wall to the right, side of the railroad siding, and to the rear wall is a passage space for reaching the pump and the line.

The pump is in the corner at the rear of the tanks near the oil unloading spot. Tank cars are unloaded from the bottom, and are connected with the pump by a 12-foot section of metal hose from the car to the inlet line opening in the wall.

The pump is a rotary driven by a three horsepower electric motor. From the pump the inlet line runs up the first tank in the battery and across the top to the last tank. From the line oil passes through a Tee at each tank, through a gate valve, and enters the tank at the bottom. A ladder is kept back of the tanks so employes may reach the valves in unloading a tank car. The inlet line has been arranged to give the effect of filling storage from the top, yet preventing syphoning.

The inlet line slants up from the first to the last tank so that oil in the line will drain to the pump to prevent contamination. Before unloading a tank car the line and pump are drained of the previous grade unloaded, by opening the plug in the line between the pump and the wall. The line is 2-inch.

In moving oil from storage tanks to trucks the plant has several hand trucks to speed up the work and to prevent injury to employes. One type of truck used catches barrels at the bottom, and has a clamp to hold to the chime at the top for moving barrels about the plant.

Employes have built a platform for moving cans with two dollies. A wooden platform, covered with a piece of sheet steel, was placed over two dollies. This platform holds sixteen 10-gallon cans, and can be shoved into bays when loaded.

Overhead is a monorail hoist for lifting cans and barrels to any place in the warehouse.

To keep oil from dripping on the floor special racks have been built for each outlet. These are movable and have a pan in the bottom for dumping the drippings. At the bottom of the rack is the pan, about a foot and a half square, and six inches deep. From each corner of the frame is an iron support to a top ring about six inches in diameter. Small cans may be placed on the ring for filling, and they will not slip off. The pans are kept under the valves except when large cans or barrels are being filled.

Package goods are stored in the warehouse on specially built steel shelves along the wall in front of the

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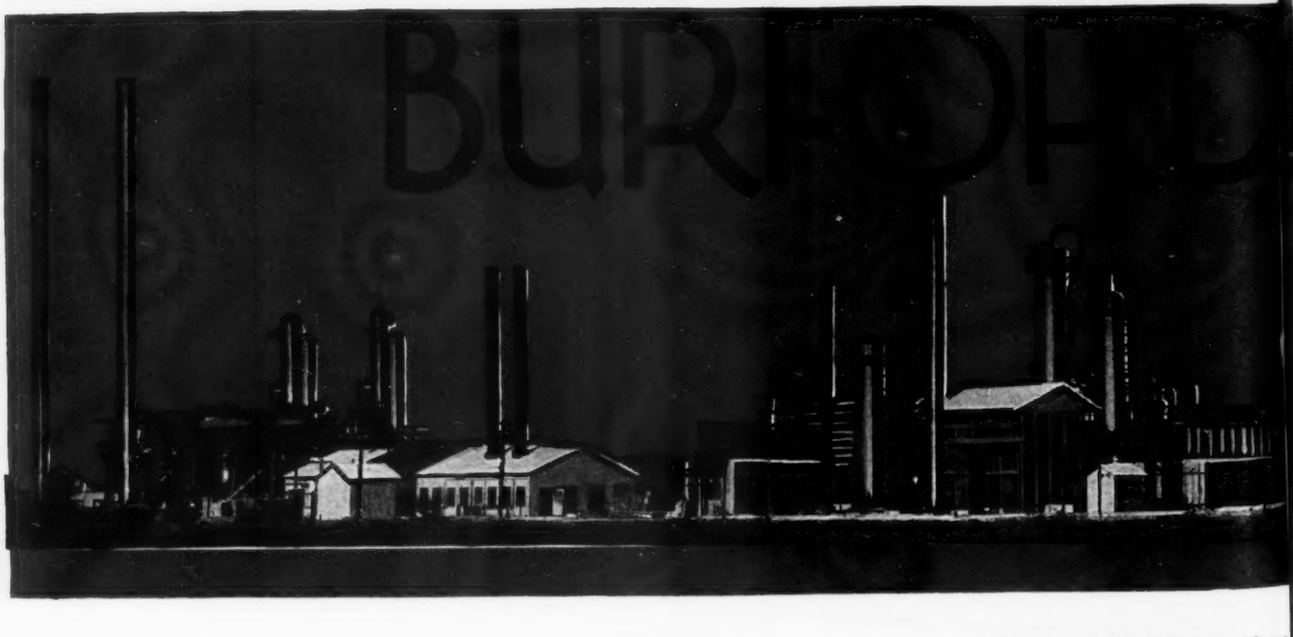

# of SUMMER gasoline business, the

and the INCREASED VOLUME you'll

high test gasoline will send your gallonage

your PEAK PROFIT YEAR

After all, from a jobber viewpoint, the true test of gasoline quality is in the repeat business it builds—the net result of which is INCREASED GALLONAGE. Silencer offers this in plenty—and more. On this high anti-knock, high test product, made by the Anti-Knock Specialists, there is a very attractive profit arrangement which will interest every jobber.

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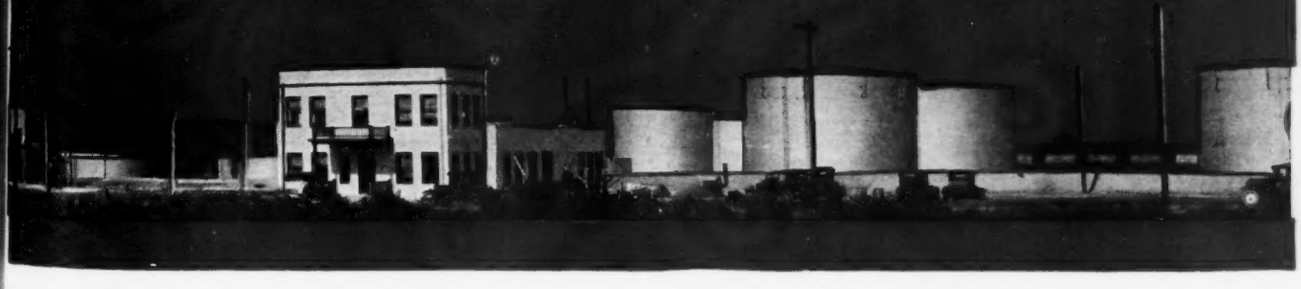

bulk oil storage. The frame is made of 2-inch pipe with sheet steel for the shelf. Heavy packages are kept on the lower shelves, and lighter goods above. The tops of the frame are fitted with threaded Tees so additional shelves may be added as needed.

The plant also is equipped for storing specialty oils purchased in small quantities. Three old 300-gallon tanks have been placed along the wall. Barrels could be emptied by hoisting above the tanks, and small cans could be filled as the tanks are equipped with shut off valves.

In the front part of the warehouse building are the company's offices a laboratory, and a service station room. The light oil storage, and alcohol warehouse is at the rear of the plant building, across the railroad siding. The siding is 425 feet long on the company's property.

The light oil storage has eight tanks and a pump house. Five horizontal tanks have a capacity of 15,000 gallons each, and three vertical tanks hold 50,000 gallons each. The horizontal tanks are in a row, on small concrete supports to keep them off the ground. The heads face the highway passing in front of the plant, and are painted in colors with the company's name and the products handled.

The vertical tanks are set on the ground, in a row back of the horizontal tanks. They are visible from the highway, and across the three is painted in black the slogan "More Power To You."

Between the two rows of tanks is a passage way, with the railroad side at the end back of the warehouse and the pump house and truck loading rack at the other end.

All goods are moved through light oil storage by pump. Mr. Maxson believes that pumping reduces the fire hazard over the gravity method of moving gasoline and kerosene. In case of fire, he said, it would be necessary to move goods by pump, but there would not be the danger of having a tank spilling on the ground through gravity loading lines.

The lines are off the ground on

L. D. Maxson
General Manager, Central Service Co., Lansing, Mich.

small concrete supports. The lines also turn at right angles. Mr. Maxson has been particular on this point as he does not want pipe running every direction; he believes an orderly arrangement gives the plant a neat appearance and helps efficient operations.

Gasoline moves through 2 inch lines painted red. Kerosene moves in a 1½ inch line painted green. Every valve, at the tanks and in the pump house, carries a metal tag stencilled with the name of the product and the direction of the flow of goods.

Inlet lines enter at the bottom of the tanks. Inside the tank is a swing joint and a length of pipe across the bottom. From the end of the line is a wire rope, passing through a stuffing box on the roof, to a windlass on the outside of the tank. The pipe inside the tank is raised above the level of the liquid, in unloading a tank car, to prevent back pressure. Raising the pipe is an additional duty in getting the plant ready for unloading a tank car that helps the employee check so the wrong car is not emptied into the right tank.

The pump house, at the head of the passage between the tanks from the siding, is of brick. At the front, away from the siding, is a platform, at truck level, for loading. Employes enter the house from the loading platform, or by a door at the side on ground level. The pumps are on a shelf along the side towards the railroad siding.

At present there are three rotary pumps, with space for a fourth, each driven by its motor. There are two 2-horsepower and one 3-horsepower motors. One pump is for commercial grade of gasoline, another for Ethyl gasoline, and the third for kerosene. The fourth pump will be for fuel oil, and is to be installed soon.

Each pump has two inlet lines; one from storage, the other from the tank car unloading rack. There are two outlet lines; one to storage, the other to the truck loading platform. All pumps are manifolded. Goods moving from tank car to storage, and to the loading platform, are metered.

Motors are controlled from a master switch on the wall in the plant warehouse. In the pump house there are safety switches, one for each motor, and there are starting and stopping switches for each motor on the loading platform.

While the pump house motors may

Lubricating oil storage in the Central Service Co. plant at Lansing, Mich. At the left is the shelving for package goods storage. Note trucks and pans to catch drippings on the floor. The bays under the tanks can store 100 *barrels*

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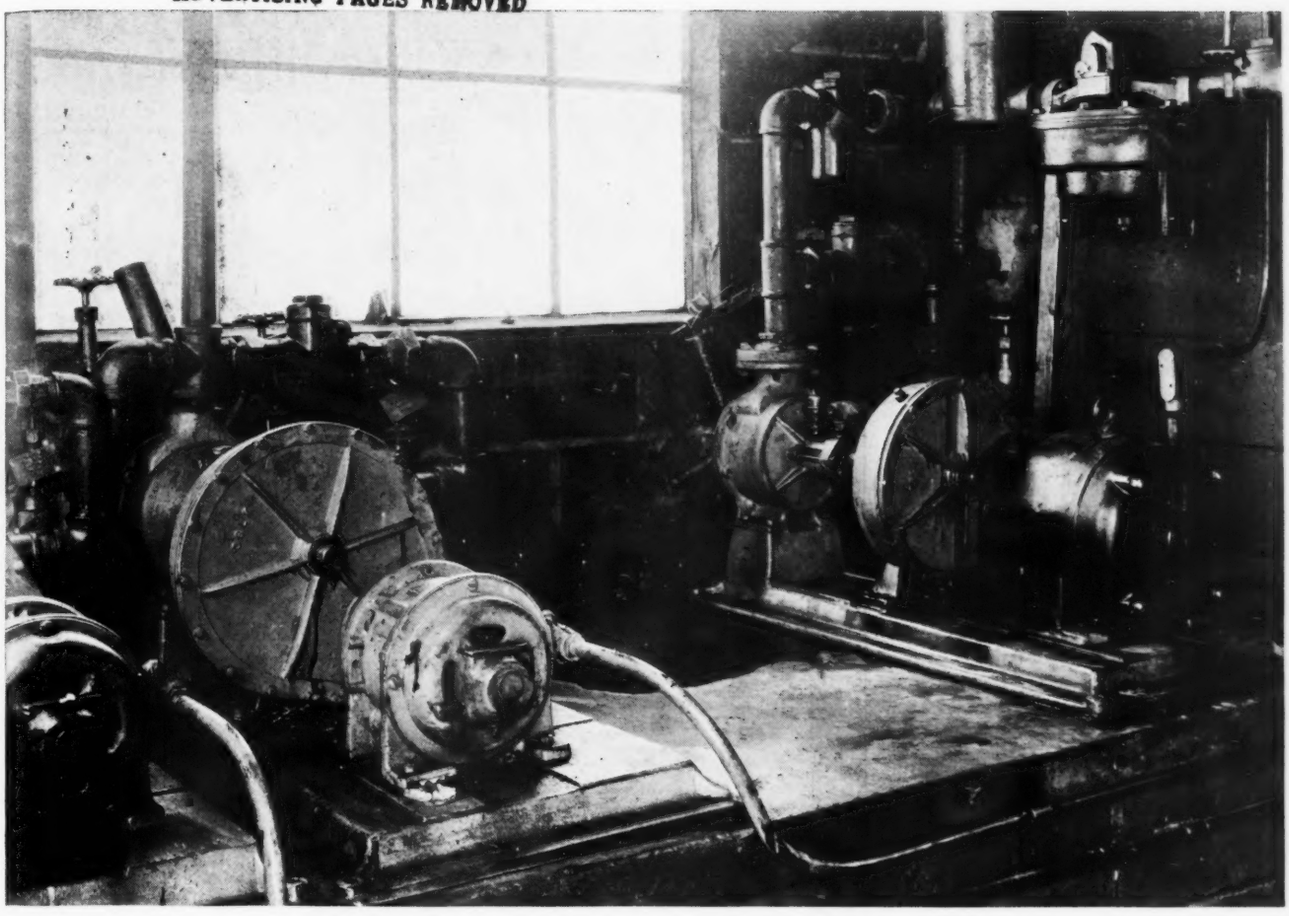


Light oil pump house. The vacant space is for a fuel oil pump. Note that the valves have metal tags showing what goes through and the direction of passage

be placed in operation from the pump house or the loading platform quick acting valves have been placed on the lines at the platform as another protection.

The vertical storage tanks were erected at the plant. Sand was filled in the site, tamped, and flooded with crank case drainings. After the bottom of the tank and the first ring were in place it was jacked up, and the bottom treated to a coat of black asphalt paint, then the job was lowered in place and completed. The horizontal tanks are raised from the ground with small concrete supports.

The alcohol warehouse is to the rear of the light oil storage and to one side, so the same drive serves the warehouse and the light oil loading platform. The building is one-story, 38 by 60 feet, of galvanized iron with a concrete floor and siding about three feet above the ground.

In winter alcohol is stored in a tank in the lubricating oil battery, and handled out of the plant in drums or cans. In the summer alcohol is removed from this storage, and the surplus stored in drums and barrels in the alcohol warehouse. The company also jobs alcohol in tank car lots.

The oil warehouse and offices are in a one-story, red face brick building, 50 by 100 feet. The warehouse is at the rear, 78 feet long by 50 feet wide. The roof is trussed with four-ply asphalt covering, and all the wall space possible has steel sashed windows so the plant has plenty of light.

Between the warehouse and the front of the building along one side are two offices, one for the accounting department, the other for Mr. Maxson. Along the other side is a small office for the warehouse man, then the laboratory, and the service station room in front.

The laboratory now has apparatus for distillation, fire and flash tests, with hydrometers and graduated flasks. Other testing apparatus is to be added. The company does not run tests on all tank car shipments, but examines a sufficient number to keep a check on the quality of its goods.

Above the offices and laboratory is storage space for signs, office supplies and other equipment, reached by a staircase from the warehouse floor. In a basement, under the executive offices, is the heating plant and water pump.

As the plant is beyond the city limits of Lansing it must provide its own water. There is a well 157 feet deep, with an automatic electric pumping unit, and a storage tank is kept at 42 pounds pressure. The basement floor is below the sewer level, so seepage water is lifted to the sewer by an automatic electric sump pump.

The heating plant is a Pacific horizontal tube boiler, and an Electrol fuel oil burner. Steam is produced for 2000 feet of radiation.

The boiler room also is used for storing fittings and salvaged parts. Bins along the wall hold the parts, with each marked as to its contents. Salvaged parts and fittings are sent to the boiler room for sorting. Parts still useful are cleaned and placed in the bins, and the remainder sold as junk.

Not only is the plant outside the city limits but it is away from other buildings. The site has four acres and allows ample room for expansion. In front of the main building, the warehouse and offices, are broad concrete drives for the service station. The rest of the front has been landscaped with grass, shrubs and flowers. Around the storage tanks and siding the plant has been kept free of weeds and the drives are gravelled.

The plant extends along the main line of the Grand Trunk Railroad for about 500 feet, and the company regulates its tank car spotting so as to have all cars out of the plant, when possible, by night.

Oil Trademarks For Copyright

The following are trademark applications pertinent to our field pending in the United States Patent office which have been passed for publication and are in line for early registration unless opposition is filed promptly. For further information address National Trade-Mark Company, Barrister Building, Washington, D. C. trade-mark specialists.

As an additional service feature to its readers, this journal gladly offers to them an advance search free of charge on any mark they may contemplate adopting or registering. You may communicate with the Editor of this Department, or send your inquiry direct to the National Trade-Mark Company, stating that you are a reader of this journal.

"MUDWATE." Ser. No. 292,647. American Mining & Chemical Co., Inc., Shreveport, La. For chemical preparation adapted to be mixed with the cuttings and ordinary mud from oil and gas well.

"F WITHIN A SHIELD." Ser. No. 291,720. The Firestone Tire & Rubber Co., Akron, Ohio. For gasoline and lubricating oil and grease.

"ASCOT." Ser. No. 292,057. Sunset Pacific Oil Co., Los Angeles, Calif. For gasoline, lubricating greases, lubricating oils.

"ALHAMBRA." Ser. No. 292,128. Standard Oil Co., of New York, N. Y. For petroleum and products of petroleum.

"TOOL TEX." Ser. No. 292,374. Sinclair Refining Co., New York, N. Y. For lubricating oils.

"ETHYL." Ser. No. 296,410. Ethyl Gasoline Corporation, New York City. For chemical carbon remover.

"MERCO," in a circle. Ser. No. 271,616. Merco Nordstrom Valve Company, San Francisco, Calif. For lubricating greases.

"FULCO." Ser. No. 294,968. E. E. Fulton Co., Chicago, Ill. For mineral oil and a compounded oil for lubricating purposes.

Fanciful checkered design. Ser. No. 295-047. Panhard Oil Corporation, New York City. For lubricating oils and greases.

"YACCO." Ser. No. 284,432. "Yacco" S. A. F., Paris, France. For lubricating oils and greases.

"OILITER." Ser. No. 295,249. Boe Mfg. Co. Minneapolis, Minn. For oil-dispensing devices for use in the display and sale of oil in separate containers.

"SERV-OIL-LITER." Ser. No. 295,250. Boe Mfg. Co., Minneapolis, Minn. For oil-dispensing devices for use in the display and sale of oil in separate containers.

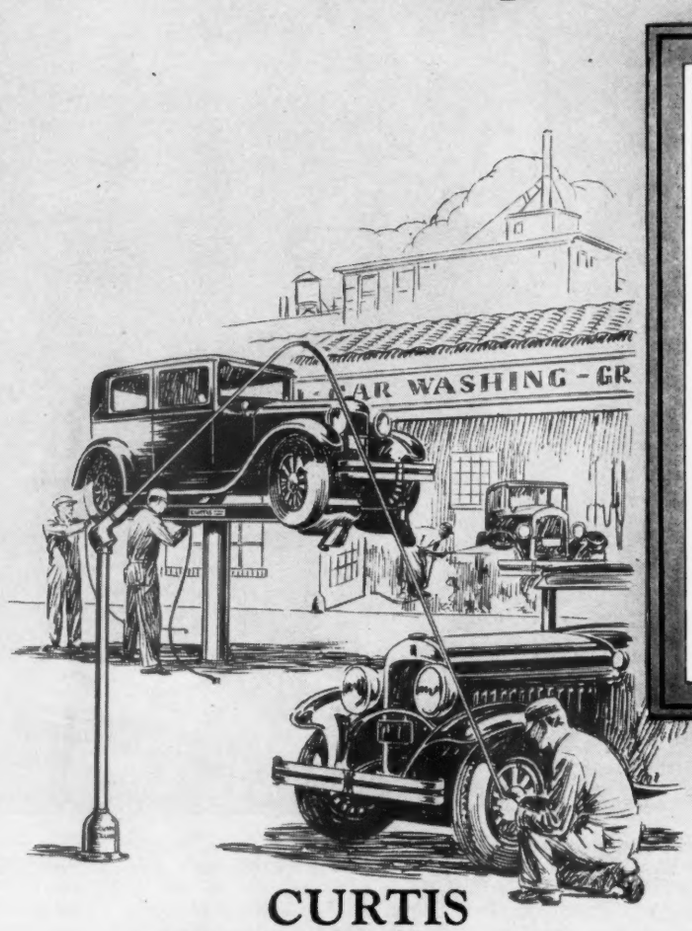
"FARCOLINE." Ser. No. 290,546. Calumet Refining Co., Chicago, Ill. For lubricating oils.

"JACARE," with picture of alligator. Ser. No. 290,626. Standard Oil Company of Brazil, Fairmont, W. Va. For refined, semirefined, and unrefined oils made from petroleum, both with and without admixture of animal, vegetable, or minerals oils, for illuminating, burning, power, fuel, and lubricating purposes, and lubricating greases.

Signs Up More Insurance For Workers

LOUISVILLE, April 25.—An increase of approximately $4,000,000 in insurance for its employes has been recently taken out by the Standard Oil Co. of Kentucky from the Equitable Life Insurance Society of the United States. This brings the Standard's total employe insurance to $12,000,000 and extends such protection to 1000 employes not heretofore eligible.

The importance of



CURTIS
75th Anniversary Line

Curtis Rotating Lift [illustrated above] increases your profits because it [1] attracts customers, [2] cuts time-cost. Inspecting, lubricating and repairing done in half the time. Lets the customer see the work. This is the *safe* lift for you and for the car. Lift always held in position by positive oil lock. Flush stuffing box design; no pits or recesses. Choice of roll-on or free wheel type.

Curtis Compressed Air Washer not only washes more cars cleaner than any other power washer, but renders a complete cleaning service. Operates cleaning attachments and pneumatic tools, furnishes air for tire inflation, etc. New features are: Timken equipped Curtis duplex compressor; more compact mounting; reduced weight.

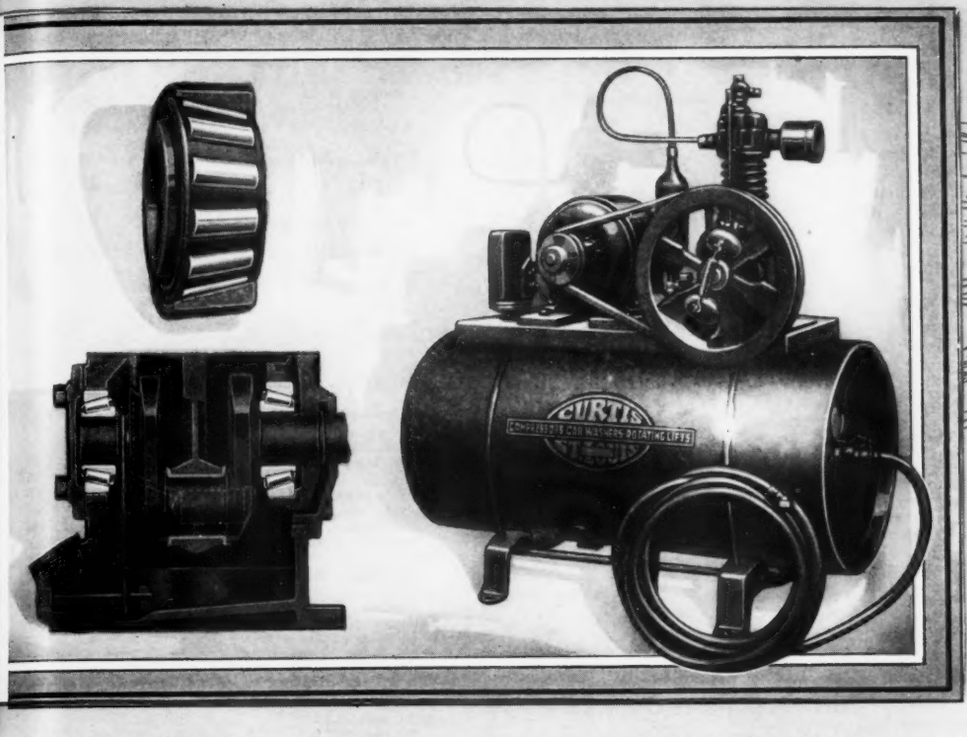
New TIMKEN equipped Curtis Compressed Air Washer

Curtis Hydraulic Car Washer—A low-priced self-contained outfit. One and two gun sizes. New slow speed pump, fully enclosed and self-oiling, specially designed by Curtis for car-wash service. Flooded and direct self-oiling systems. Special alloy steel rust-resisting double-heat-treated nozzle discs. Automatic pressure governor.

Curtis Hydraulic Car Washer

Curtis Air Stands—Reel and Tower types with or without water attachments.

"Timken Bearing Equipped"



Five important Curtis features: Timken Bearings; Centro-Ring Oiling; "V"-belt drive, which eliminates belt tightener; light rigid steel base and universal motor mounting.

NEW standards of super service have brought heavier duty to compressors—because of increased tire inflation and the wider use of car washers, lifts, lubrication devices, air tools and other modern equipment.

This has made old standards of compressor construction obsolete. And Curtis, as always, is first to recognize the need, and meet it, with a complete Timken-Bearing Equipped Line.

The importance of "Timken Bearing Equipped" cannot be over-stated because it provides the higher standards of compressor service now needed in three directions —

1. Greater economy — elimination of friction brings operating economies that in this day of heavy compressor service is of real money consequence.

2. Longer life —With practically no friction, there is practically no wear. "Timken Bearing Equipped" means years longer life. Lubrication costs become negligible; maintenance is practically eliminated.

3. With Timken Bearings, the tapered principle permits bearing adjustments for wear that keep Curtis compressors to highest efficiency all the time.

Another most important improvement is the Curtis Positive "Centro-Ring" Oiling System [Patents pending]. It is a development of the Curtis controlled splash system, but is as much of an improvement over that system as the controlled splash was over ordinary lubrication methods.

A ring lifts the oil from the reservoir to a special undercut groove in the crankshaft. Here, centrifugal force carries the oil under pressure through ducts to a chamber in the crankshaft. From this chamber, the oil is redistributed by centrifugal force to the ribs in the crankcase. These ribs catch the oil thrown by the revolving crankshaft and lead it directly and in controlled volume to each friction point.

In the Curtis Compressor there is no mere random splashing of oil which is so likely to cause excess oil to be carried in to the air lines.

CURTIS

CURTIS
Pneumatic Machinery Company
St. Louis

The superiority in design and manufacture of Curtis Car Washers, Auto Lifts, Bearing Compressors, etc., are subject to such thorough demonstrations and proof that sound business judgment should induce anyone interested in such products to get in touch with the Curtis organization or its representatives, before purchasing.

Curtis Pneumatic Mchy. Co.
1965 Kienlen Ave., St. Louis—518-X Hudson Term., N.Y.

Please send catalog and information about [State product you are interested in]_____

*Name*_____

*Address*_____

New Stations Building

Note: Material used in this column is principally taken from the newspapers. NATIONAL PETROLEUM NEWS assumes no responsibility for its accuracy.

The list as published from week to week cannot be looked upon as indicative of the relative extent to which stations are being built in various parts of the country.

Albany, Mo.—Mid-Continent Petroleum Corp., filling station.
Las Animas, Colo.—J. T. Elder, filling station.
Boulder, Colo.—Leroy Miller, service station.
Sublette, Kans.—White Eagle Oil & Refining Co., filling station.
Kansas City, Mo.—Universal System of Kansas, service station.
Charlotte, N. C.—W. R. Stroupe & Son, service station.
Geneva, N. Y.—Firestone Service Stores, Inc., service station.
Uniontown, Pa.—Firestone Service Stores, Inc., service station.
Spring Valley, N. Y.—Harry Herzog, filling station.
Charlotte, N. C.—Standard Oil Co., service station.
Savannah, Ga.—Atlantic Refining Co., filling station.
Dothan, Ala.—Shell Petroleum Corp., distributing station.
Oneida, N. Y.—Standard Oil Co., filling station.
Greenville, S. C.—Gulf Refining Co., filling station.
Elmira, N. Y.—Van Dyne Oil Co., Inc., filling station.
Anderson, S. C.—A. P. Cater, filling station.
Raleigh, N. C.—T. B. Bailey, filling station.
Raleigh, N. C.—H. N. Parrish, filling station.
Morgantown, W. Va.—Sinclair Refining Co., filling station.
Elkton, Md.—Gulf Refining Co., distributing station.
Philadelphia, Pa.—Gulf Refining Co., service station.
Charleston, S. C.—Standard Oil Co., filling station.
Charlotte, N. C.—General Tires, Inc., service station.
Plankinton, S. D.—E. A. Spencer, service station.
Belmond, Ia.—Geo. Coburn, service station.
Cedar Rapids, Ia.—Cities Service Oil Co., service station.
Cedar Rapids, Ia.—Shell Petroleum Corp., filling station.
Omaha, Neb.—U. S. Oil Works, filling station.
Billings, Mont.—Yale Oil Corp., filling station.
Wessington Springs, S. D.—Curtis Reedy, filling station.
Cape Girardeau, Mo.—Phillips Petroleum Co., filling station.
Ft. Dodge, Ia.—Shell Petroleum Corp., service station.
Carthage, Mo. — Mid-Continent Petroleum Corp., service station.
Carthage, Mo.—Continental Oil Co., bulk and filling stations.
Columbia, Mo.—Petroleum Oil Co., filling station.
St. Cloud, Minn.—Shell Petroleum Corp., service station.
Mankato, Minn.—Genevieve Mechelke, filling station.
St. Cloud, Minn.—Dr. P. E. Stangel, filling station.
Minneapolis, Minn.—E. F. Wandersee, filling station.
Mapleton, Minn.—Mapleton Oil Co., bulk station.
River Falls, Minn.—The Independent Oil Co., bulk and service stations.
Mankato, Minn.—Northern States Oil Co., service station.
Iowa City, Ia.—Skelly Oil Co., service station.
Cherryvale, Kans.—Penny Oil Co., filling station.
Sedalia, Mo.—Continental Oil Co., filling station.
Higginsville, Mo.—Milton Oil Co., service station.
Muscatine, Ia.—Fred Giesler, filling station.
Escanaba, Mich.—Cloverland Oil Co., filling station.
Minneapolis, Minn.—C. W. Brown, filling station.
Minneapolis, Minn.—A. W. Warner, filling station.
Jordan, Minn.—Scott County Oil Co., filling station.
Mt. Pleasant, Ia.—John Linch, filling station.
Houston, Tex.—The Texas Co., filling station.
Houston, Tex.—Shell Petroleum Corp., filling station.
Coffeyville, Kans. — Mid-Continent Petroleum Corp., filling station.
Lamar, Colo.—White Eagle Oil & Refining Co., filling station.
Big Spring, Tex.—Magnolia Petroleum Co., filling station.
Maplewood, Mo.—A. G. Harlan, service station.
Lohrville, Ia.—Troxel Bros., service station.
Palymra, Pa.—Standard Gasoline Co., Inc., service station.
Wilkes-Barre, Pa.—Atlantic Refining Co., filling station.
Cedar Rapids, Ia.—Phillips Petroleum Co., service station.
Pittsburgh, Pa.—Standard Oil Co., filling station.
Kane Junction, Pa.—Kendall Refining Co., service station.
East Rochester, N. Y.—Clark Oil Co., filling station.
Hudson, N. Y.—Columbia Petroleum Products Co., filling station.
Port Washington, L. I.—F. S. Hutchinson, filling station.
Warsaw, N. Y.—Shell Eastern Petroleum Products, Inc., filling station.
Laconia, N. H.—Shell Eastern Petroleum Products, Inc., Philadelphia, filling station.
Westbury, N. Y.—Henry Broer, service station.
Virginia, Minn.—John Dickenson, service station.
Medford, Wis.—Beintker & Hug, service station.
Independence, Kans.—Standard Oil Co., filling station.
Manhattan, Kans.—Long Oil Co., filling station.
Ft. Worth, Tex.—Empire Development Co., filling station.
Ft. Worth, Tex.—Joe Collins, filling station.
Lawrence, Kans.—L. L. Riling, filling station.
Ada, Okla.—Cities Service Oil Co., filling station.
St. Cloud, Minn.—Standard Oil Co., service station.
Cincinnati, O.—Refiners Oil Co., distributing station.
Marshall, Minn.—J. A. Trude & J. A. Knabe, filling station.
Jonesboro, Ark.—J. T. Medlin, filling station.
Phillipsburg, Kans.—Continental Oil Co., filling station.
Davenport, Ia.—The Texas Co., filling station.
Lamar, Colo.—Midwest Refining Co., filling station.
St. Cloud, Minn.—Cities Service Oil Co., filling station.
Fergus Falls, Minn.—Cities Service Oil Co., filling station.
Cape Girardeau, Mo.—Simpson Oil Co., filling station.
Marshfield, Mo.—H. P. Highfill, filling station.
Springfield, Mo.—T. S. Cross, filling station.
Abbeyville, La.—Shell Petroleum Corp., distributing station.
Huron, S. D.—E. A. Pugsley, service station.
Toledo, Ia.—C. E. Webb & Ed. R. Davis, filling station.
Burlington, Ia.—Burlington Oil Co., filling station.
N. Wilkesboro, N. C.—F. C. Forester, service station.
Birch Tree, Mo.—Shell Petroleum Corp., filling station.
Kinsley, Kans.—Kinsley Oil Co., service station.
Kirwin, Kans.—Westenhaver & LaRue, filling station.
St. Cloud, Minn.—Pure Oil Co., filling station.
Stanley, N. D.—Standard Oil Co., service station.
Louisville, Ky.—Stoll Oil Refining Co., tank station at Hopkinsville, Ky., and service stations in Louisville, Franklin and Elizabethtown, Ky.

A service station of the Gulf Refining Co. at Philadelphia, illuminated by Glow lantern floodlights

ADVERTISING PAGES REMOVED

The Dutch Mill Service Co. tourist camp station near Omaha, Neb.

Tourist Camp Stations Patterned After Dutch Windmills

By E. L. Barringer
N. P. N. STAFF WRITER

KNOXVILLE, Iowa

A CHAIN of service stations in this district, some with tourist camps adjoining, is patterned after the windmills of Holland.

These stations are called Dutch Mill stations, and are operated by the Dutch Mill Service Co., which has headquarters in Knoxville, Iowa. Officials of the company are B. H. Gholson, president; J. L. Collins, vice-president, and L. D. Tucker, secretary-treasurer.

Five tourist camp stations, and five service stations, comprise the chain now. Ultimately the company plans to expand considerably.

B. H. Gholson, president of the company and originator of the Dutch Mill design, and R. F. Ginn, one of the officials of the company and manager of the tourist camp near Omaha, had the name and design copyrighted. Several stations in the middle west have been licensed to erect this type of building, but the company plans to develop its own chain.

Tourist camps have been built at Millard, Neb., about 10 miles southwest of Omaha, at Albia and Corydon, Iowa and St. Joseph and Kansas City, Mo. Service stations are at Knoxville, Millerton, Newton, Garden Grove, and Logan, Iowa. The company maintains bulk plants at these points.

The first camps were opened at Albia and Corydon in 1927. The Millard camp was erected last year. At Logan the company has a property that may be converted into a tourist hotel. Last year an old hotel was taken over; the station is on the ground floor, and on the second floor is space sufficient for 11 rooms.

Accommodations provided tourists at the camps are sleeping quarters, a shower bath, lunch room, tobacco and candy counter, and gasoline, motor oil, complete lubrication and accessories for the auto. Facilities are provided so the tourist may wash his car for 50 cents. The camp furnishes water, sponge and chamois; the tourist provides his own labor.

A cabin with one double bed rents for $1.50 a night; with two double beds $2.50. The rate is reduced 50 cents if the guest supplies his own sheets. Soap and towels are furnished by the camp.

The camp at Corydon has one cabin, that at Albia five cabins. In building the Albia camp hollow tile was the building material, and the cabins were put in a row. This plan was discarded when the 20-cabin Millard camp was built last year.

The chief advantage of the cabins-in-a-row layout was a compactness that made for comfortable rooms in the chilly fall and spring months. The barracks appearance was thought to detract from the camp so at Millard the cabins were staggered, of varied design and made of wood. It was thought this would make the camp more inviting in appearance.

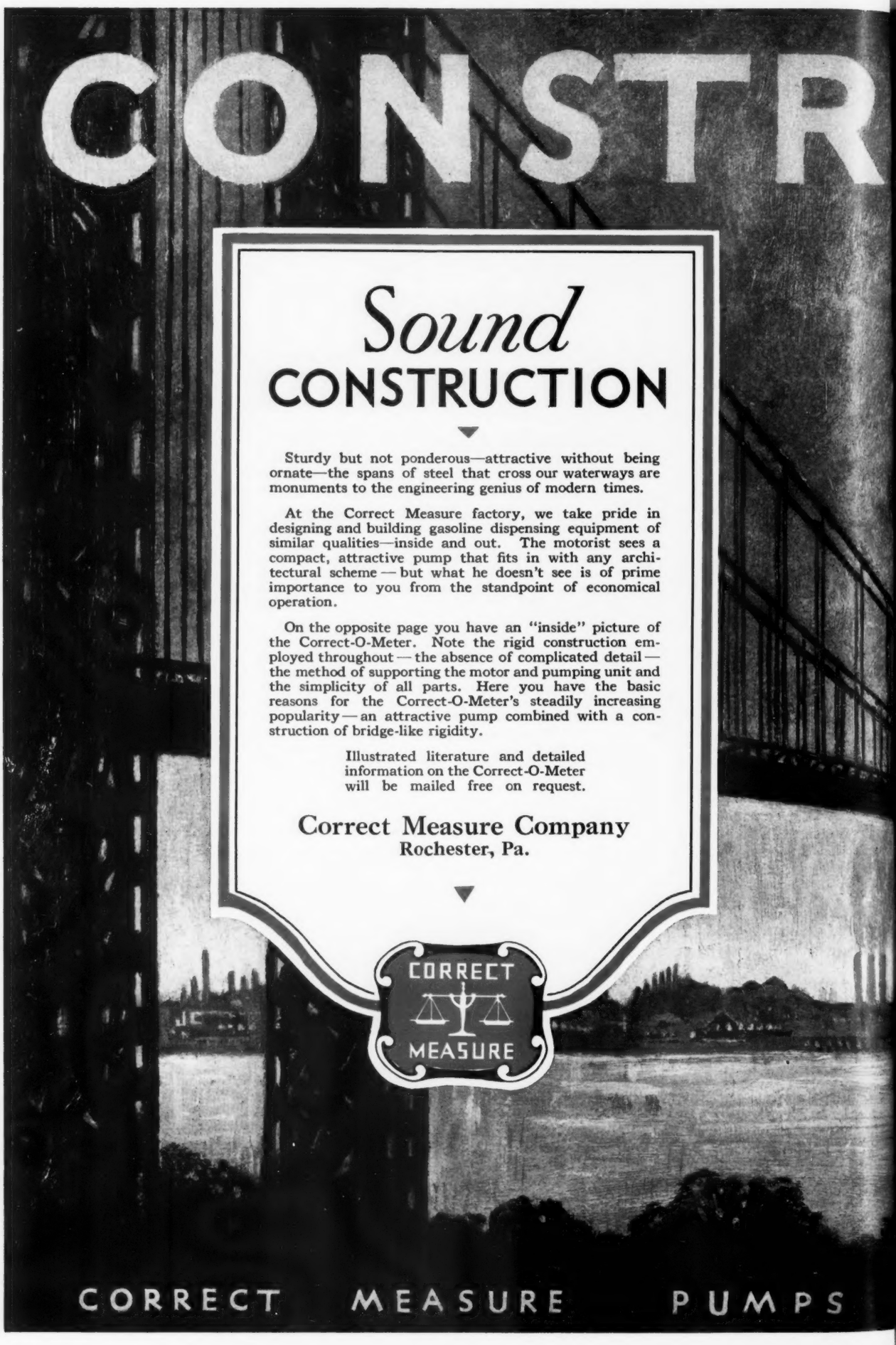
Cabins are adjoined by a stall for the automobile. Each room is outfitted with a rocking chair, several straight back chairs, table, rug, bed, and wash bowl. The camps have two rest rooms, each with toilet and shower with hot and cold water. Only cold water is piped to the cabins.

The manager lives at the camp, in quarters above the station, and attends to renting cabins and operating the station. Drinking parties and noise are banned, and the company has had the minimum of these disturbances. Electric lights illuminate the camp grounds, but tourists may turn these off when they desire.

Camp stations are open 24 hours a day. Tourists and motorists from the nearby towns patronize the station in the daytime. At night there is business from the late tourist and from trucks that take the road after sun down.

To sell the camp services highway billboards, personal solicitation of tourists, and word of mouth advertising are used. The billboards are erected on highways about 50 miles on all sides of the camps.

From 6 p.m. on the station attendants are alert for business. If a tourist shows signs of stopping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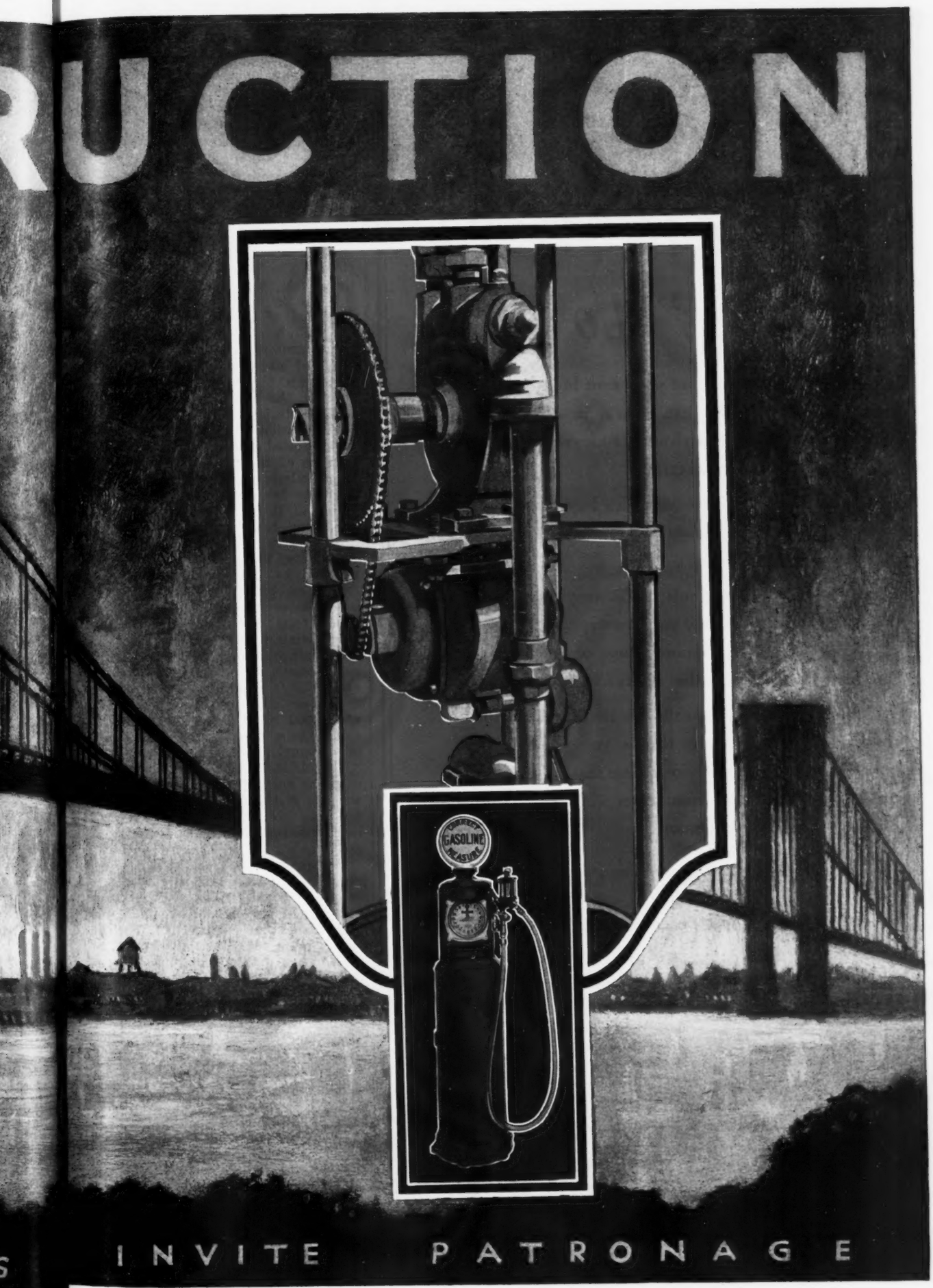
Sound
CONSTRUCTION
Sturdy but not ponderous—attractive without being ornate—the spans of steel that cross our waterways are monuments to the engineering genius of modern times.
At the Correct Measure factory, we take pride in designing and building gasoline dispensing equipment of similar qualities—inside and out. The motorist sees a compact, attractive pump that fits in with any architectural scheme — but what he doesn't see is of prime importance to you from the standpoint of economical operation.
On the opposite page you have an "inside" picture of the Correct-O-Meter. Note the rigid construction employed throughout — the absence of complicated detail — the method of supporting the motor and pumping unit and the simplicity of all parts. Here you have the basic reasons for the Correct-O-Meter's steadily increasing popularity — an attractive pump combined with a construction of bridge-like rigidity.
Illustrated literature and detailed information on the Correct-O-Meter will be mailed free on request.
Correct Measure Company
Rochester, Pa.
CORRECT
MEASURE
CORRECT MEASURE PUMPS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Over 700 Jobbers *Say "Yes" To This!*

DOES it pay to market your own brand of motor oil, providing you can get a super-quality — one made from 100% Pennsylvania crude—at a price that makes substantial profits certain?

More than 700 oil jobbers who buy from this 50 year old refinery organization would answer "Yes." *And they ought to know.*

We'll make up any grade of "Pennsylvania" motor oil (Sharples Process) to your own specifications. Or if you prefer, we'll recommend one of our own tried and tested specifications that will exactly suit your needs.

Whether your order calls for tank cars, compartment tank cars, barrels or drums, you are assured of prompt and efficient service. Your request for details and quotations will receive immediate attention.

Guaranteed 100% PURE PENNSYLVANIA OIL

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Refineries at FREEDOM and CORAOPOLIS, PA.

Also available for immediate shipment

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600 Flash Steam Refined
Freedom Filtered Kerosene Oil

FREEDOM

100% PENNSYLVANIA OILS

FO-503

in front of the station an attendant runs out. He suggests spending the night at the camp, but if the tourist indicates a desire to cover more ground in the evening, road and hotel information is given cheerfully.

Some attendants are good salesmen, Mr. Gholson said, and will average close to 100 per cent in getting the tourist to drive in for the night.

When an attendant is assigning a cabin he will inquire if service for the auto is desired. The gasoline tank will be filled, the oil checked or drained, or the car lubricated, if desired. The guest is also told about the lunch room.

While in the cabin the tourist is reminded of the service station. On the wall is a sign to the effect that clean, comfortable accommodations are provided at a reasonable rate, and in return the management will appreciate the guest's patronage at the service station.

The station manager at some camps is interested financially, and receives a share of the profits each month as a commission. Managers are local men who take an active part in enterprises of the community.

Staticn camps have been located near towns, yet away from traffic congestion to keep the camp quiet as well as to make it easy for a driver to turn in. The drives are long, beginning from 75 to 100 feet away from the station, so a car may swing to the pump islands.

The ultimate plan is to have similar cabin camps across the country, about every 75 to 100 miles. Mr. Gholson estimates that a tourist averages about 300 miles a day, so he would always be within easy driving distance of a camp.

The distinctive design of the station, with the windmill arms 24 feet across and the stations painted in red, white and blue colors each spring, is credited with being a big sales factor by Mr. Gholson.

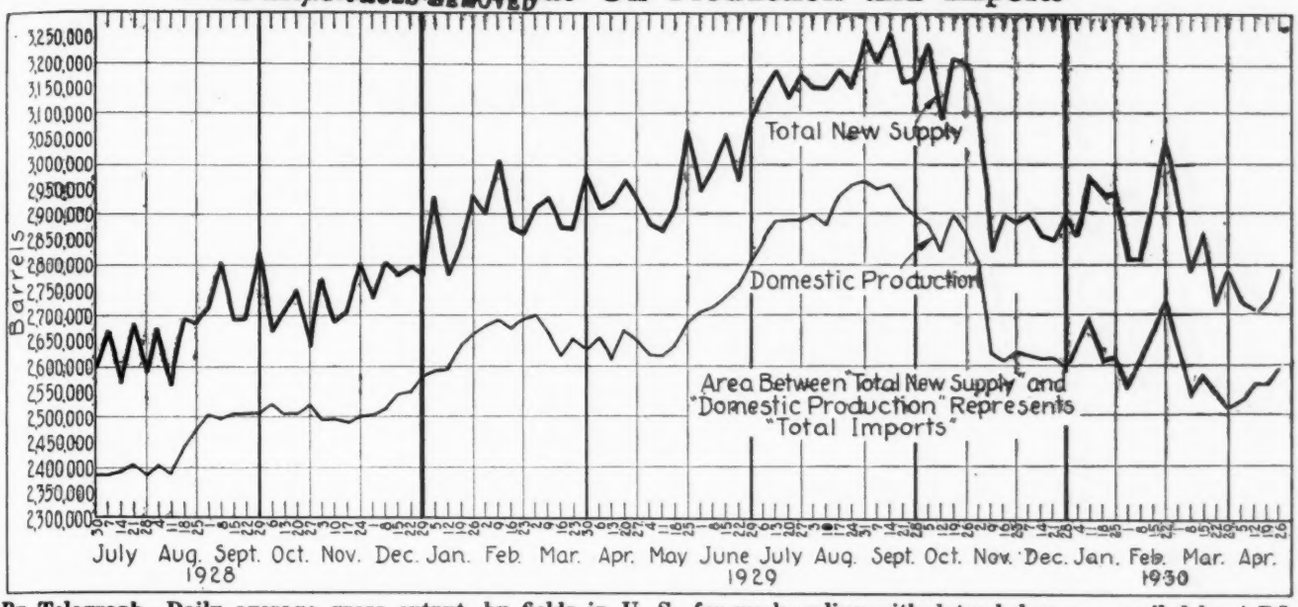
"Frequently we see tourists approach the station and begin to slow down," he said. "You can see them crane their necks to look up at the mill, then they swing in. The design makes the stations stand out from other stations, and the idea of cleanliness and comfort is suggested by a Dutch Mill."

The Dutch Mill design is the result of Mr. Gholson's work about six or seven years ago. He was connected with the Collins Oil Co., a large jobber in the middle west that sold out to the Sinclair Refining Co. in 1926. For several years he studied station design with the thought that an attractive, different station building would be a sales help.

When the Collins Oil Co. was sold he organized his company and established headquarters in Knoxville. After mulling over many ideas Mr. Gholson decided that the Dutch Mill design was appropriate as it denotes cleanliness and the name and type of building fit each other.

ADVERTISING PAGES REMOVED

Daily Average Crude Oil Production and Imports



By Telegraph—Daily average gross output, by fields in U. S., for week ending with dates below as compiled by A.P.I.

PRODUCTION SUMMARY	Apr. 26	Apr. 19
Production east of Rockies	1,959,300	1,933,000
Increase		26,300
Total production in U. S.	2,590,100	2,560,900
Increase		29,200
Crude oil imports	200,285	165,285
Increase		35,000
Total crude supply	2,790,385	2,726,185
Increase		64,200

OKLAHOMA		
Allen Dome	19,150	19,400
Asher	2,050	2,100
Blackwell	3,300	3,300
Bowlegs	20,500	21,200
Braman	3,500	3,500
Bristow-Slick	16,200	16,200
Burbank	16,560	16,400
Carr City	8,750	9,650
Cromwell	7,650	7,650
Cushing	14,050	14,300
Davenport	1,150	1,150
Duncan District	7,700	7,450
Earlsboro	40,000	38,950
East Earlsboro	41,450	39,450
Fox	1,250	1,250
Garber	4,750	4,750
Graham	3,500	3,500
Healdton	11,900	11,900
Hewitt	7,050	7,150
Hubbard	1,600	1,600
Konawa	9,300	7,650
Little River	38,850	41,950
Little River, East	17,400	19,500
Logan County	6,600	6,600
Maud	5,600	5,550
Mission	12,600	12,600
North Okmulgee	10,900	10,900
Oklahoma City	109,200	104,150
Osage (Outside Burbank)	26,500	26,700
Papoose	2,850	2,850
Pearson	650	650
Sasakwa	13,650	10,550
St. Louis	36,850	38,200
Scholem-Alechem	13,700	13,750
Searight	11,000	10,400
Seminole	19,900	20,150
Seminole, East	3,750	3,350
South Okmulgee	6,300	6,300
Thomas	700	700
Tonkawa	7,800	7,800
Wewoka	3,700	3,700
Yale-Jennings	8,600	9,350
Others	63,900	63,900
Total, Oklahoma	662,050	658,100
Increase		3,950

KANSAS		
Augusta-Fox Bush	2,950	2,900
Churchill	4,450	4,300
El Dorado-Towanda	14,300	13,450
Florence-Covert	800	800
Greenwood County	18,800	18,950
Oxford	2,600	2,650
Peabody-Elbing	3,150	3,300
Rainbow Bend	1,100	1,100
Russell	3,550	3,400
Sedgwick County	21,000	20,900
Voshell	19,700	12,800
Others	33,500	32,500
Total, Kansas	125,900	117,050
Increase		8,850

NORTH LOUISIANA		
Caddo, light	10,000	10,050
Caddo, heavy	2,850	2,900
Cotton Valley	2,150	2,150
De Soto and Red River	3,100	3,100
Haynesville	4,500	4,550
Holly	1,050	1,150
Homer	3,400	3,450
Sarepta Carterville	2,900	3,150
Urania	5,200	5,300
Zwolle	5,100	4,150
Others	1,750	1,800
Total, N. Louisiana	42,000	41,750
Increase		250

ARKANSAS		
Champagnolle	4,600	4,750
El Dorado	4,000	4,000
Lisbon	1,000	1,000
Nevada	850	1,000
Smackover, light	5,300	5,400
Smackover, heavy	40,300	40,500
Stephens	950	950
Others	900	200
Total, Arkansas	57,900	57,800
Increase		100

TEXAS (OUTSIDE GULF COAST)		
Panhandle District		
Carson County	8,950	9,700
Gray County	63,000	60,800
Hutchinson County	22,300	21,900
Wheeler County	550	700
Others	500	500
Total, Panhandle Texas	95,300	93,600
Increase		1,700
North Texas		
Archer County	18,000	18,000
Burkburnett	8,300	8,050
Electra	11,300	11,300
Iowa Park and K. M. A.	5,550	5,300
Montague-Cooke	10,650	10,600
Wilbarger	24,000	24,100
Others	2,000	2,000
Total, North Texas	79,800	79,350
Increase		450
West Central Texas		
Brown County	7,600	7,600
Callahan County	3,600	3,650
Coleman County	4,600	4,600
Eastland-Desdemona	5,500	5,500
Jack County	4,100	4,100
Palo Pinto County	700	700
Shackleford County	6,550	6,500
Stephens County	5,850	5,800
Throckmorton County	850	850
Young County	20,800	13,450
Others	1,400	1,400
Total, West Central Texas	61,550	54,150
Increase		7,400
West Texas		
Crane and Upton Counties	44,000	43,500
Crockett County	2,000	2,100
Ector County	9,800	8,100
Howard County	40,000	40,100
Jones County	2,100	2,100
Mitchell and Scurry Counties	2,200	2,200
Reagan County	17,350	16,500
Winkler County	79,100	79,650
Yates	114,800	112,200
Balance Pecos County	4,750	4,700
Others	2,700	2,800
Total, West Texas	318,800	313,950
Increase		4,850
East Central Texas		
Boggy Creek	3,600	3,650
Corsicana-Powell	6,100	5,900
Currie	300	300
Mexia	4,350	4,000
Nigger Creek	200	200
Richland	250	250
Van Zandt	20,700	19,100
Wortham	900	850
Total, East Central Texas	36,400	34,250
Increase		2,150
Southwest Texas		
Dale	350	300
Darst Creek	17,000	15,000
Laredo District	8,400	8,300
Luling	9,700	9,800
Lytton Springs	900	900
Salt Flat	20,850	21,200
Somerset	1,400	1,300
Others	1,950	2,000
Total, Southwest Texas	60,550	58,800
Increase		1,750
Total, Texas (Outside Gulf Coast)	652,400	634,100
Increase		18,300

GULF COAST		
Coastal Texas		
Barbers Hill	22,200	26,300
Batson	1,200	1,200
Big Creek	3,450	2,800
Blue Ridge	1,800	1,800
Boling	1,100	1,150
Damon Mound	600	600
Esperson	3,200	3,100
Fannett	1,100	1,100
Goose Creek	4,450	4,300
Hull	8,550	8,700
Humble	19,600	20,200
North Dayton	550	1,000
Orange County	2,400	2,300
Pierce Junction	10,500	10,350
Port Neches	1,750	1,800
Raccoon Bend	10,200	9,000
Refugio County	39,750	40,850
Saratoga	1,000	1,000
Somerville	1,750	1,750
Sour Lake	2,200	2,200
South Liberty	4,850	4,450
Spindletop	16,550	15,600
Sugarland	10,200	11,050
West Columbia	6,000	5,800
Others	8,100	7,300
Total, Coastal Texas	183,050	185,700
Decrease		2,650
Coastal Louisiana	**Apr. 26**	**Apr. 19**
East Hackberry	2,500	2,600
Old Hackberry	1,300	1,300
Edgerly	500	500
Evangeline	900	900
Lake Barre	1,000	1,000
Lockport	2,700	2,700
Port Barre	1,750	2,300
Sulphur Dome	4,300	4,300
Vinton	3,850	3,850
Others	2,050	2,050
Total, Coastal Louisiana	20,850	21,650
Decrease		800
Total, Gulf Coast	203,900	207,350
Decrease		3,450

ROCKY MOUNTAIN		
Wyoming		
Big Muddy	2,050	2,050
Elk Basin	700	800
Grass Creek	2,000	2,200
Labarge	2,100	1,900
Lance Creek	150	150
Lost Soldier	3,150	3,250
Oregon Basin	4,450	4,450
Rock River	2,200	2,200
Salt Creek	30,050	31,200
Others	3,700	2,500
Total, Wyoming	50,550	50,700
Decrease		150
Montana		
Cat Creek	1,200	1,200
Pondera	1,850	3,200
Sunburst	5,600	6,000
Others	50	50
Total, Montana	8,700	10,450
Decrease		1,750
Colorado		
Florence	550	600
Fort Collins	1,400	1,450
Moffat (Craig)	1,000	1,100
Others	1,450	1,400
Total, Colorado	4,400	4,550
Decrease		150
New Mexico		
Artesia	700	700
Balance Lea and Eddy Counties	8,000	7,800
Hogback	450	450
Rattlesnake	450	1,500
Table Mesa	100	100
Others	900	900
Total, New Mexico	10,600	11,450
Decrease		850
Total, Rocky Mountain	74,250	77,150
Decrease		2,900

CALIFORNIA		
Dominguez	9,800	9,700
Elwood-Goleta	47,700	47,500
Huntington Beach	28,200	29,000
Inglewood	17,600	17,600
Kettleman Hills	15,600	14,000
Long Beach	99,000	98,800
Midway-Sunset	70,000	70,000
Santa Fe Springs	130,700	130,500
Seal Beach	24,000	24,800
Ventura Avenue	46,200	44,000
Others	142,000	142,000
Total, California	630,800	627,900
Increase		2,900

EASTERN		
(Not including Michigan)	129,000	128,000
Increase		1,000

MICHIGAN		
Mt. Pleasant	7,100	6,700
Muskegon	4,600	4,800
Saginaw	200	200
Total, Michigan	11,900	11,700
Increase		200

Compilation Of Mid-Continent Refinery Operations

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Mid-Continent Refinery Operations Week Ended April 25 (By Telegraph)

	Kansas	Oklahoma	North & Cent. Texas	West Texas	North La.-Ark.	Total Week Ended Apr. 25
Plants Reporting	12	29	25	15	12	93
Da. Av. Cap. (Bbls.)	94,500	161,700	106,100	82,000	77,000	521,300
Da. Cracking Capacity	30,700	52,600	17,200	5,000	22,700	128,200
Da. Av. Crude Runs	76,815 — 0.4	124,949 — 4.8	73,652 — 0.7	46,402 + 3.2	64,844 + 5.8	386,662 — 0.6
Da. Av. Other Oils	9,656 + 14.6	2,720 — 38.7	2,023 — 31.7	2,655 — 30.1	1,593 +162.0	18,647 — 7.8
GASOLINE—Gallons						
Stocks, Apr. 18	25,164,000	66,003,000	22,488,000	8,972,000	13,346,000	135,973,000
Prod. 4-18 to 4-25	12,752,000 + 2.0	19,948,000 — 5.6	10,080,000 + 4.4	4,321,000 — 15.5	6,481,000 + 12.8	53,582,000 — 1.0
Ship. 4-18 to 4-25	11,929,000 — 19.6	16,518,000 — 22.6	9,106,000 — 14.4	3,543,000 — 44.9	5,899,000 — 2.6	46,995,000 —20.7
Stocks, Apr. 25	25,987,000 + 3.3	69,433,000 + 5.2	23,462,000 + 4.3	9,750,000 + 8.7	13,928,000 + 4.4	142,560,000 + 4.8
Ratio Sales to Prod.	93.5%	82.8%	90.3%	82.0%	91.0%	87.7%
KEROSENE—Gallons						
Stocks, Apr. 18	7,429,000	5,916,000	2,726,000	23,000	2,192,000	18,286,000
Prod. 4-18 to 4-25	2,845,000 + 15.0	2,939,000 + 2.6	1,757,000 + 15.1	.....	414,000 + 7.8	7,955,000 + 9.7
Ship. 4-18 to 4-25	2,237,000 + 8.5	1,953,000 — 43.5	1,521,000 — 2.6	.....	840,000 + 61.2	6,551,000 — 13.8
Stocks, Apr. 25	8,037,000 + 8.2	6,902,000 + 16.7	2,962,000 + 8.6	23,000	1,766,000 — 19.4	19,690,000 + 7.7
Ratio Sales to Prod.	78.6%	66.5%	86.6%	.....	202.9%	82.4%
STOVE DISTILLATE—Gallons						
Stocks, Apr. 18	2,679,000	2,845,000	174,000	233,000	83,000	6,014,000
Prod. 4-18 to 4-25	276,000 + 1.5	584,000 — 12.6	154,000 — 37.1	124,000 + 9.7	56,000 — 69.9	1,194,000 — 19.5
Ship. 4-18 to 4-25	—113,000	733,000 — 14.9	122,000 — 42.5	122,000 + 24.5	122,000 — 18.1	986,000 — 46.7
Stocks, Apr. 25	3,068,000 + 14.5	2,696,000 — 5.2	206,000 + 18.3	235,000 + 0.9	17,000 — 79.5	6,222,000 + 3.5
Ratio Sales to Prod.	.....	125.5%	79.2%	98.4%	217.9%	82.6%
GAS OIL—Gallons						
Stocks, Apr. 18	7,444,000	43,006,000	2,412,000	5,076,000	8,793,000	66,731,000
Prod. 4-18 to 4-25	1,798,000 — 1.2	2,424,000 — 16.0	821,000 — 21.5	245,000 — 55.7	2,628,000 + 8.5	7,916,000 — 9.3
Ship. 4-18 to 4-25	1,276,000 + 18.8	1,771,000 + 9.9	1,385,000 +339.6	555,000 + 82.6	2,237,000 + 0.4	7,224,000 + 30.5
Stocks, Apr. 25	7,966,000 + 7.0	43,659,000 + 1.5	1,848,000 — 23.4	4,766,000 — 6.1	9,184,000 + 4.4	67,423,000 + 1.0
Ratio Sales to Prod.	71.0%	73.1%	168.7%	226.5%	85.1%	91.3%
FUEL OIL—Gallons						
Stocks, Apr. 18	16,013,000	34,583,000	67,465,000	14,103,000*	24,319,000	156,483,000*
Prod. 4-18 to 4-25	5,960,000 — 1.4	6,798,000 — 15.0	8,709,000 — 0.9	6,901,000 — 2.5	5,890,000 + 2.7	34,258,000 — 3.9
Ship. 4-18 to 4-25	4,649,000 + 6.5	6,472,000 + 65.5	7,879,000 — 6.0	5,984,000 + 5.9	4,788,000 — 11.8	29,772,000 + 7.4
Stocks, Apr. 25	17,324,000 + 8.2	34,909,000 + 0.9	68,295,000 + 1.2	15,020,000 + 6.5	25,421,000 + 4.5	160,969,000 + 2.9
Ratio Sales to Prod.	78.0%	95.2%	90.5%	86.7%	81.3%	86.9%

Gasoline Produced by Various Methods, Week Ended April 25

	Kansas	% of Total	Oklahoma	% of Total	North & Cent. Texas	% of Total	West Texas	% of Total	Louisiana-Arkansas	% of Total	Total	% of Total
Straight Run	7,498,000	58.8	12,881,000	64.6	6,943,000	68.9	3,957,000	91.6	2,543,000	39.2	33,822,000	63.1
Cracked	4,301,000	33.7	5,507,000	27.6	2,358,000	23.4	192,000	4.4	2,965,000	45.7	15,323,000	28.6
Natural	953,000	7.5	1,560,000	7.8	779,000	7.7	172,000	4.0	973,000	15.1	4,437,000	8.3
Total	12,752,000		19,948,000		10,080,000		4,321,000		6,481,000		53,582,000	

+ or — columns are % change over previous week.

*Revised.

Gasoline Shipments Drop 12,300,000 Gallons

Staff Special—By Telegraph
TULSA, April 28

GASOLINE shipments from Mid-Continent refiners reporting operations to this publication dropped 12,300,000 gallons in the week ended April 25 as buying quieted down after the rush caused by the crude and tank wagon advances. In the previous week shipments reached a new high record of 59,299,000 gallons. Shipments for the week under review were 46,995,000 gallons.

Crude runs at reporting plants were kept at relatively high levels in spite of the sharp drop in demand. As a result gasoline stocks increased almost 7,000,000 gallons in the week. Crude runs were cut only 2200 barrels daily average and gasoline output was off only 500,000 gallons.

Kerosene production increased while shipments of that product also dropped.

Summary for the Month

Production and shipments, all reporting refineries, for four weeks ended April 25. Change in stocks figures from March 28.

	Gallons
GASOLINE	
Production	203,357,000
Shipments	206,580,000
Net change in stocks	—3,223,000
Ratio sales to production	101.6%
KEROSENE	
Production	27,819,000
Shipments	27,635,000
Net change in stocks	+184,000
Ratio sales to production	99.3%
STOVE DISTILLATE	
Production	5,437,000
Shipments	6,027,000
Net change in stocks	—590,000
Ratio sales to production	110.9%
GAS OIL	
Production	33,140,000
Shipments	27,970,000
Net change in stocks	+5,170,000
Ratio sales to production	84.4%
FUEL OIL	
Production	134,176,000
Shipments	122,837,000
Net change in stocks	+11,339,000
Ratio sales to production	91.5%

Stocks in the field as a whole increased 1,400,000 gallons. Louisiana-Arkansas refiners were the only ones to draw on storage. Stove distillate stocks also increased.

Stocks of gas oil increased 600,000 gallons although there was a drop in production of that amount and shipments increased 1,700,000 gallons. Fuel oil stocks continued to increase.

Lindbergh Used Richfield Aviation Fuel

NEW YORK, April 26.—Col. Charles Lindbergh used Richfield aviation fuel on his recent record breaking hop from Los Angeles to New York City, according to Ray M. Parker, Jr., vice president of the Richfield Oil Co. of New York.

"It is the custom of many aviators planning transcontinental hops and endurance flights to use an oil company's gasoline if the company will furnish it free," Mr Parker said.

"But Col. Lindbergh didn't do that. He went to the Richfield company in Los Angeles, made arrangements to obtain his gasoline and then paid for it. He also paid for 200 gallons of Richfield gasoline at Wichita, Kans, where he came down for a brief rest and more fuel."

Col. Lindbergh gave the company permission to use his photograph in connection with an advertising campaign initiated upon his landing at New York.

Strawberries Illustrate Gasoline

NEW YORK, April 28.—A dish of luscious strawberries on which a stream of thick velvety cream is being poured illustrates an advertisement of a gasoline to which Ethyl fluid has been added.

Such an advertisement was run recently in the New York Evening Post by the Standard Oil Co. of New York. It was captioned "Socony Special plus Ethyl is like the finest strawberries plus cream."

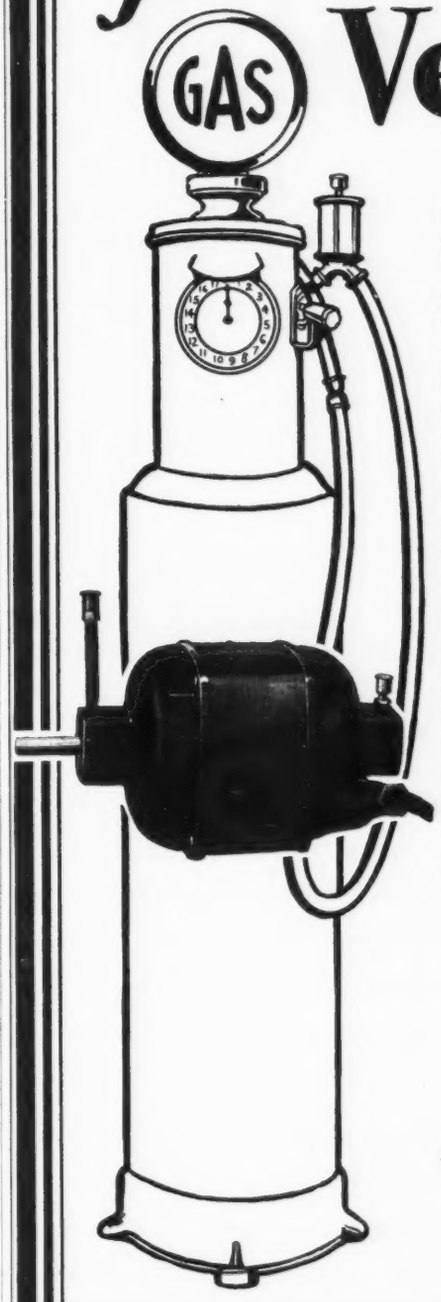
"Put good cream on ordinary strawberries—a fair dessert. Put good cream on the finest strawberries—a wonderful dessert.

"Ethyl fluid is like cream. Put Ethyl in ordinary gasoline, and the gasoline becomes better. Put Ethyl in the best possible gasoline—and you have the finest motor fuel that science has yet produced."

RICHMOND, Va.—An octagonal-shaped, brick and stucco super service station, was opened here in April by the Richmond Motor Co., Inc. It has a colored decorative frieze below the roof line finished in attractive blue and surmounted by a tower of diffused glass through which interior lights illuminate the roof.

Three groups of floodlights illuminate the station at night. There are three wide approaches to the station. W. G. King is president.

Lelands Lead *for* Gasoline Vending



Excelling in design and operating characteristics Leland Vapor Resisting Motors have won the confidence of a majority of gasoline vending system manufacturers.

These motors are especially designed for use in explosive atmospheres, are compact, rugged and reliable, and are easily accessible for inspection and adjustment while in service.

Ample reserve power provides for cool running under all normal loads, and for periods of abnormal overload.

Leland Vapor Resisting Motors, due to their unusual construction, can be depended upon to perform indefinitely under the most trying operating conditions.

Whether for horizontal or vertical installation, there is a Leland adaptable to each requirement. Interchangeability of frames provides for ready attachment to motor mounting.

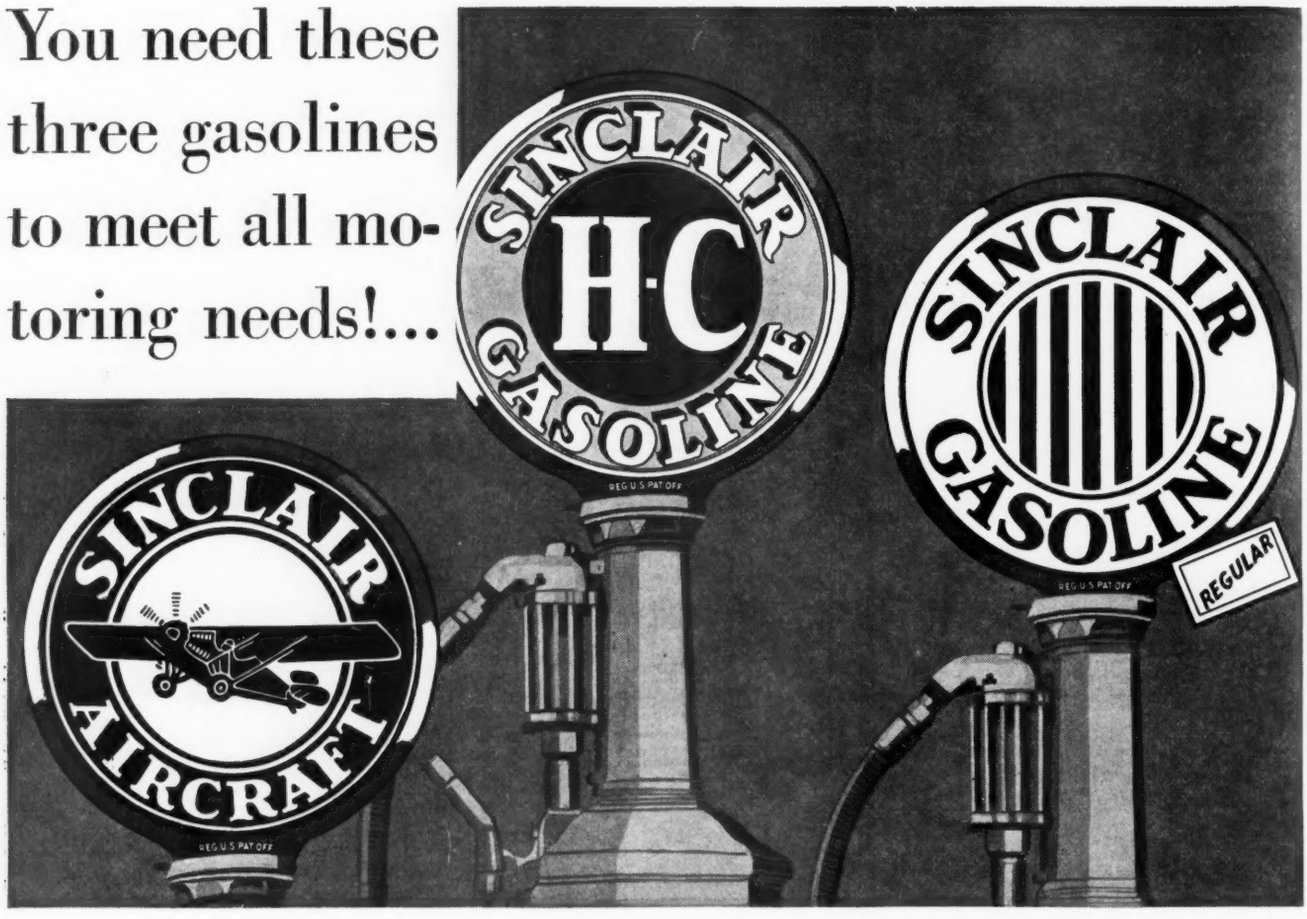
Full information on Vapor Resisting Motors will be furnished upon request.

A. C. Single Phase
D. C. Compound
A. C. Polyphase
Interchangeable Frames

The Leland Electric Co.
Dayton, Ohio.
U. S. A.

Leland
fractional horsepower
motors

You need these three gasolines to meet all motoring needs!...



Sell SINCLAIR THREE-GAS SERVICE!

The easiest way to increase your gallonage is to offer every motorist the opportunity to select the RIGHT gasoline for his own engine and his own driving habits.

Let him choose from THREE DIFFERENT KINDS, through Sinclair Three-Gas Service.

If he wants his engine to get away like a rocket, to be flashy in traffic and brilliant on the road, then recommend Sinclair Aircraft Gasoline . . . the *Ace* of high test gasolines. Sinclair Aircraft is the Ace of high test gasolines because it is specially manufactured at Sinclair Refineries, meeting the requirements of the Federal Specifications Board for Aviation Gasoline—domestic grade—and gives sustained power. Due to its careful fractionation it is free from dissolved gases which cause gas locks, uneven distribution, galloping and engine balk.

Or, if he wants the remarkable high compression gasoline that stops knocks in his engine and takes the hills in high . . . then his gas is H-C. It's all gasoline, nothing added.

Or, if he prefers to pay three cents less per gallon—here's Sinclair Regular Gasoline—full of eager power—full of economy and mileage. The quality gasoline at a popular price!

Try selling Sinclair Three-Gas Service—you'll sell more satisfaction and get more volume.

SINCLAIR REFINING COMPANY, INC., 45 Nassau Street, New York—*Atlanta, Chicago, Houston, Kansas City*

Refinery - Tank Wagon Markets

National Petroleum News

Gasoline Activity Subsides in All Districts Except Pennsylvania

CLEVELAND, April 29

LITTLE change was noted in gasoline tank car markets last week with the possible exception of the Pennsylvania district where prices continued to push forward.

Retail markets also were relatively quiet. Standard Oil Co. of Kentucky early in the week advanced its posted tank wagon and service station prices of gasoline 1 cent throughout its territory and the eastern seaboard area was rife with rumors regarding the likelihood of the three Standard companies there advancing prices, but the large number of local retail price revisions which have occurred almost daily since the first of the year were lacking last week.

Probably the outstanding event of the week marketwise was the posting by Standard Oil Co. of California of a price at which it will buy U. S. Motor gasoline. It marks the first time any oil company has posted a price it will pay for a refined oil and the Standard's action apparently is an effort to stabilize the gasoline market on the west coast. Discussion of the event more in detail appears elsewhere in this issue of NATIONAL PETROLEUM NEWS.

Jobber buying of gasoline for forward delivery continued unabated in the Pennsylvania market. Spot U. S. Motor moved up 0.25 cent to 8 cents as a result, bringing the market for this commodity up 1 cent from the low point of the year.

Spot buying of gasoline remained extremely light in middle western markets and shipments against contracts fell off considerably as evidenced by the drop of over 12,000,000 gallons in gasoline shipments as reported to NATIONAL PETROLEUM NEWS by 93 Mid-Continent refiners.

Seaboard markets, both domestic and export, were comparatively quiet. Gasoline prices on the west coast, however, moved up slightly under the stimulus of improved retail market conditions.

A large middle western refiner purchased approximately 200 cars of fuel oil in the Pennsylvania market to be used as cracking stock, but aside from this market for all commodities other than gasoline were featureless from the standpoint of both activity and prices.

Resale Gasoline Dominates in Chicago

Staff Special

CHICAGO, April 26

SPOT gasoline buying was small in volume in the Chicago resale market last week and carlot marketers who had purchased material for April shipment prior to the Standard of Indiana's tank wagon advance, continued to dominate the market.

While opinion was divided as to the quantity of long gasoline still available at low prices, the consensus of opinion was that given some good motoring weather and a fair spot demand, all of this gasoline would be off the market by May 3.

Even in the event of bad weather, all gasoline purchased for shipment in April would have to be in transit by May 1, if refiners were unwilling to extend shipping dates. In view of the fact that this long gasoline had been holding back any advance in spot market prices, it appeared unlikely to most buyers that any extensions would be granted. In this case, about May 6 would see the end of this material.

Several sellers reported a better movement of spot gasolines during the latter days of the week, but most sellers said they had difficulty getting shipping instructions even for gasoline sold considerably under the general market. Cold weather was the rule over most of the middle west and this held down motoring considerably. However, a number of refiners reported a steady movement of their gasolines to jobbers under contract with them.

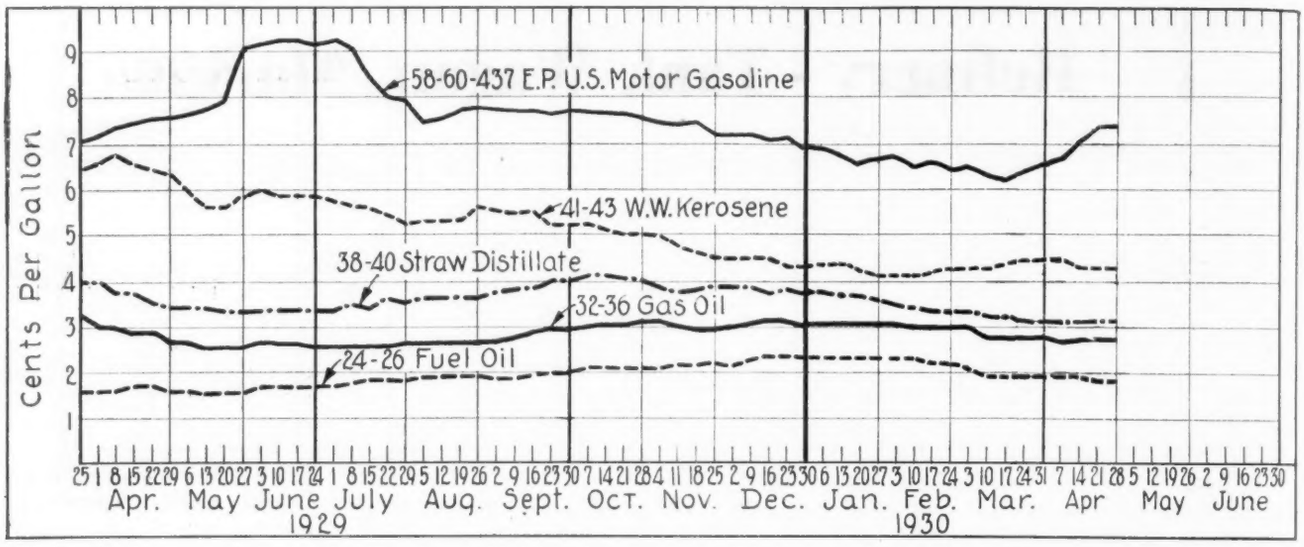
Reports from several sections of the Standard of Indiana marketing territory indicated that many jobbers had their gasoline storage filled and consequently were unable to buy any more, even at bargain prices. Some jobbers reported they already were paying demurrage on several cars of gasoline and would be out of the market for some time unless unusually good motoring weather set in. One jobber said he had filled his storage when U. S. Motor gasoline was selling at under 6 cents and since then had been buying on the spot market only for replacement.

Gasolines for May shipment were a major topic of interest and some difference of opinion was noted with reference to prices over this period. Carlot marketers generally reported they were unable to buy in Oklahoma for May shipment at under 7.50 cents and most of them were unwilling to pay this price. Others said they believed a buy at 7.50 cents would be all right for the last half of May, as there was a good chance of another tank wagon advance. A few small sales of U. S. Motor for delivery over the entire month at 7.50 cents were reported.

Marketers reported that lower prices were being offered by some north and west Texas refiners than those prevailing in Oklahoma. Offers of 7.25 cents, f.o.b. Group 3, for shipment over May were reported. One north Texas refiner offered U. S. Motor for shipment the first 20 days in May at 7.125 cents, Group 3.

Sales of U. S. Motor gasoline for prompt shipment were reported at a wide range of prices last week, depending on the destination and how badly the seller needed shipping instructions. Sales were reported as low as 6.625 cents and as high as 7.50

Current Prices of Principal Mid-Continent Refined Products


58-60-437 E.P. U.S. Motor Gasoline
41-43 W.W. Kerosene
38-40 Straw Distillate
32-36 Gas Oil
24-26 Fuel Oil
Cents Per Gallon
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr May June
1929
1930

Prices shown are in Group 3 basis and extended to date shown in Refinery Market Tables Section of this issue

cents, although neither of these prices were in the majority. The bulk of sales of full specification U. S. Motor, for shipment over the full ten day period, were reported at 7.125 to 7.375 cents.

There still was a quantity of off specification gasoline of 58-60 gravity available for shipment over the remainder of April and this gasoline was moved at around 6.75 to 7 cents.

Practically all the Oklahoma refiners were quoting U. S. Motor at 7.50 cents for prompt shipment, but most of them said they were selling very little for spot shipment. Other refiners, located in Oklahoma, Texas and the Chicago territory, reported spot sales at 7.25 and 7.375 cents.

Kerosenes were offered at lower prices by several sellers. They reported their demand had been light and they were forced to lower prices in order to get shipping instructions. Other sellers reported a steady call and held their prices unchanged. Sales of 41-43 w.w. were reported mostly at 4.25 to 4.50 cents on April 26, as against 4.375 to 4.50 cents prior to that date.

One refiner reported an occasional sale at 4.625 cents. He said that demand had been good so far this spring and his stocks of kerosene were low. Several marketers said their kerosene demand had been disappointing this year. Some of them thought the cold weather had held back spring work on the farms and that demand would pick up later, especially from the more northern states. An Indiana jobber said his kerosene tank wagon business so far this spring had been better than gasoline, but that the heavy spring consumption was now over in his territory.

Most of the fuel oil business last week was confined to contract buying by industrial concerns, and even this was not very heavy. Furnace oil distributors generally reported a comparatively active demand due to the cooler weather.

Several Chicago distributors reported signing contracts for a portion of their next winter's fuel oil requirements. They said that these generally were higher than those prevailing last winter. It was reported that the new contracts on 18-22 fuel carried a minimum price of $0.60 and a maximum of $0.80, and called for the average of a published price date of shipment, instead of the low used last winter.

Generally unsettled weather with occasional shower periods probably will prevail over most of the Standard of Indiana territory next week. Moderate temperatures are likely in most sections, says the Chicago weather bureau.

KANSAS CITY, Mo.—Loy E. Thomason has been appointed to the sales department of the Security Petroleum Co. here, succeeding Lee R. Saunders, resigned, according to Edwin F. Borgolte, president.

Shipments From Southern California

LOS ANGELES, April 24.—Bulk petroleum shipments from Southern California ports for week ended April 19 were as follows:

Destination	Crude	Gasoline	Diesel	Kerosene	Fuel	Gas-Oil	Total
Pacific For.	133,507	37,127	30,784	157,048	506,634	.....	865,100
Atlantic Dom.	.....	325,253	.....	108,920	.....	.....	434,173
Atlantic For.	.....	303,735	.....	.....	.....	.....	303,735

Prices 10 Years Ago
April 26, 1920

	Oklahoma	Penna.
58-60 U. S. Motor	23.00c	24.50c
80-84 Natural	18.00–19.00c	.....
Kerosene (41-43 Okla.; 47 w. w. Pa.)	11.25–11.50c	15.25–15.50c
Fuel Oil (24-26 Okla.; 38-40 Pa.)	$2.90–$3.25	13.25–13.50c
Crude (Okla. 35-35.9)	$3.50	$6.10
Chicago tank wagon		25.00c

Prices A Year Ago
April 29, 1929

	Oklahoma	Penna.
58-60 U. S. Motor	7.5635c	9.25–9.75c
Grade A Natural	7.75c	.....
Kerosene (Okla. 41-43; Pa., 47 w. w.)	6.25–6.50c	8.50–8.75c
Fuel Oil (Okla. 24-26; Pa. 36-40)	$0.65–$0.75	5.25–5.75c
Crude (Okla. 35-35.9)	$1.17	$4.00
Chicago tank wagon		14.00c

Mid-Continent Refinery Markets

Inclement Weather Eases Gasoline Demand

Staff Special
TULSA, April 26

INCLEMENT weather in many sections of the middle west and the heavy buying of gasolines the first week after the crude and tank wagon advances April 10 and 12 combined to keep the Mid-Continent gasoline market quiet throughout the week of April 21 and 26. Lower prices developed in spots late in the week but the majority of the trade considered this situation only temporary, and predicted a better tone for the market by the beginning of the next month.

The record shipments of gasoline from the Mid-Continent for the week ended April 18 was a clear indication that jobbers rushed into the market after the crude and tank wagon advances and tried to fill their storage before the tank car prices could respond to the advances. The bulk of the gasoline apparently was moved on contracts, but it nevertheless found its way into storage tanks.

Marketers who had bought gasolines ahead had little opportunity to compete with the refiners shipping on contracts and they had to bide their time, which came this week. With the new contract price reflecting the crude and tank wagon advances, marketers began quoting their gasolines at prices at which they could make a profit. But the business was not there due to the full storage tanks and the adverse weather conditions which set in.

The result was a slowing up in shipments in almost every district. A few of the smaller refiners who had sold ahead to marketers found themselves with sufficient orders but in many cases with a scarcity of shipping instructions. Several marketers reported they had been pushed all week for shipping instructions. In order to get the gasoline out some quotations were made by marketers at virtually cost price late in the week.

That the weather really had been a handicap was indicated by the statement of a sales manager for a large company having its own retail distribution, in which it was said the company's station shipments this week had dropped a third.

The announcement by the Standard Oil Co. of California that it would buy U. S. Motor gasoline at 6.50 cents, f.a.s. San Pedro, Calif, caused many favorable comments in this district. This move, it was believed, would put a decided crimp in the movement of gasoline to the east coast where it would be dumped at unusually low prices, giving the buyers an opportunity to move it inland a considerable distance in competition with the seaboard, Pennsylvania and Illinois-Indiana refiners.

The trade generally, however, watched closely for any favorable signs which would indicate export business in the Mid-Continent for May. It was understood late in the week that tentative inquiries had been made as to the amount of gasoline the various refiners would have available for export shipment in May but no definite promises of purchases had been reported. With the prices based on the posted prices at the Gulf it was generally believed little export business could be done in the Mid-Continent until those posted prices were advanced.

Natural gasolines remained comparatively active the entire week with material scarce. Only minor fluctuations in prices were noted but it was believed generally this was due primarily to the U. S. Motor market marking time.

A few manufacturers late in the week cleaned up their odd lots before the first of the month but obtained the market price for the gasoline. There was considerable uncertainty as to May business, and this again was attributed to the refined gasoline market.

A few manufacturers reported their refiner accounts had held up shipments somewhat late in the month, stating that their finished gasolines had not been moving as well as they had anticipated.

Oklahoma apparently was the easiest spot in the Mid-Continent as far as kerosene demand was concerned. The bulk of the kerosene in that state, however, was in the hands of the larger companies and indications were it would be closely held. The Kansas refiners continued to enjoy an excellent demand for their kerosene, while the Texas refiners reported their independent accounts in that state were giving them considerable help. The Louisiana and Arkansas refiners apparently were in a good technical position with reference to kerosene stocks.

An export sale of 250,000 gallons of 41-43 w.w. grade was reported in Oklahoma April 25, the price being reported at 4.125 cents. An inquiry also was reported in Louisiana but no orders had been reported placed prior to close of business April 26.

Gas oils were generally inactive in the Mid-Continent but prices were unchanged with the exception of Arkansas. Distillates were virtually out of the picture although a few of the trade expressed an opinion there might be a slightly increased demand temporarily due to the cool weather in the north the past few days. The increased demand, however, would be of short duration and it was doubtful if it would be reflected in the price structure.

Fuel oils were freely offered in all districts and the apparently light demand was not attributed so much to the price as to the fact that many large industrial users have not been operating at their usual spring capacity.

Bright stock demand was only fair, a majority of refiners reported. Quotations were unchanged in Oklahoma for domestic shipment although some quotations were reported at lower figures for export movement. The lower export quotations were made, it was explained, in order to compete with other districts for that business.

Neutral oils were in active demand, virtually all makers in Oklahoma reported. Prices generally were unchanged from the previous week.

Wax demand was extremely light and price was fractionally lower.

Part of Code Suspended In 3 More States

CLEVELAND, April 28.—The last 10 words of Rule 17 of the code of ethics and the commercial account definition has been suspended in New Jersey, Delaware, Maryland and the District of Columbia, following the suspension of the same clauses in Pennsylvania a month ago.

This suspension permits, without violation of the code, the selling of gasoline at discounts to commercial users at service stations without the requirement of a contract or a charge account.

McKean to Insulate Tanks

Pittsburgh, April 21.—A contract for the insulation of twelve storage tanks was let a few days ago by the McKean County Refining Co. to the Save All Insulation Co. of Pittsburgh. The latter company specializes in insulation problems, employing aluminum or other metal sheet as a protector for the main insulation material underneath. The tanks to be insulated are in the Farmer's Valley plant of the McKean company.

Comparative Prices of 58-60 U. S. Motor Gasoline, 437 E. P., Group 3 and Point of Origin, to Jobbers Only

In Effect April 28

	Price F.O.B. Group 3		*Price F.O.B. Point of Origin*		*If for Particular Destination*
Oklahoma	7.2500	(Wt. Avg.)	7.2500	(Wt. Avg.)	
Kansas	7.50				S. O. Neb. & Indiana Territory, etc.
Kansas			7.7500	(Wt. Avg.)	Kansas only.
North Texas	7.25–7.50		7.125–7.375		
West Texas	7.50		7.50		
Louisiana-Arkansas	7.25–7.50				Michigan, Ohio and Indiana.
Louisiana-Arkansas			7.75		State or differential haul.
Indiana-Illinois	7.25–7.50		*		S. O. Indiana territory except Detroit and vicinity. For Ohio on delivered basis only.

*Shipments made from E. Chicago, Ind., and Wood River, Ill., according to conditions and freight rates; no prices F.O.B. point of origin can be given.

Chicago Resale Market

CHICAGO, April 26

SPOT gasoline demand was light in most quarters of the Chicago market last week. Sales of full specification U. S. Motor for shipment within ten days were reported mostly at 7.125 to 7.375 cents. Sales of gasoline in transit and also some off specification 58-60 gravity gasoline were reported as low as 6.625 cents. A few refiners reported spot sales at 7.50 cents.

Marketers reported receiving offers of west and north Texas Motor for May shipment at 7.25 to 7.50 cents, Group 3 basis. They reported that Oklahoma refiners were unwilling to sell under 7.50 cents for future shipment and many of them would not quote a price.

Following prices represent majority of sales made on Group 3 freight basis, although shipments may originate in other refining districts such as north and west Texas, Arkansas, Louisiana, Indiana, Illinois, Kentucky, etc.

	Prices Apr. 28	Prices Apr. 21	Prices Apr. 14
58-60 U. S. Motor, 437 e.p.	7.125– 7.375	7.125– 7.25	†7.00 – 7.50
60-62 437 e.p. gasoline	7.25 – 7.50	7.25 – 7.50	†7.125– 7.50
60-62 400 e.p. gasoline	7.50 – 7.75	7.50 – 7.75	†7.375– 7.75
64-66 375 e.p. gasoline	7.75 – 8.00	7.75 – 8.00	†7.75 – 7.875
68-70 350-360 e.p. gasoline	8.00 – 8.25	8.00 – 8.25	†8.00 – 8.25
*Domestic Aviation Gasoline	9.50 – 9.75	9.50 – 9.75	9.50 – 9.75
41-43 w.w. kerosene	4.25 – 4.50	4.375– 4.50	4.375– 4.50
42-44 w.w. kerosene	4.625– 4.75	4.625– 4.75	4.625– 4.75
38-40 straw distillate	3.00 – 3.125	3.00 – 3.125	3.00 – 3.125
32-36 ordinary dark gas oil	2.375– 2.625	2.375– 2.625	2.50 – 2.625
32-36 dark zero gas oil	2.50 – 2.75	2.50 – 2.75	2.625– 2.75
32-36 straw zero gas oil	2.625– 2.75	2.625– 2.75	2.75 – 2.875
28-30 zero fuel oil (per bbl.)	$0.925–$0.95	$0.925–$0.95	$0.95 –$1.00
28-30 fuel oil (per bbl.)	$0.90 –$0.95	$0.90 –$0.95	$0.95 –$1.00
24-26 fuel oil (per bbl.)	$0.75 –$0.80	$0.75 –$0.80	$0.775–$0.825
18-22 fuel oil, low sulfur (per bbl.)	$0.625–$0.675	$0.625–$0.675	$0.65 –$0.70
18-22 fuel oil, high sulfur zero (per bbl.)	$0.60 –$0.65	$0.625–$0.65	$0.625–$0.675

*Prices are based on U. S. Gov't. specifications or better. Present Gov't. specifications require distillation range of 5% recovery at not more than 167° F., and not less than 122° F.; 50% recovery at 221°.; 90% at 311°; 96% at 347°; end point 374° F. Gasoline of fighting grade specifications in some instances sells at a premium over domestic aviation grade. Prices represent majority of quotations.

†Represents both sales and quotations.

Weighted Average Prices

OKLAHOMA

	Apr. 28		Apr. 21		Apr. 14	
	No. of cars	Price	No. of cars	Price	No. of cars	Price
58-60 U. S. Motor, 437 e.p.	6	7.2500	7	7.4107	14	7.0714
60-62 437 e.p. gasoline	4	7.4062	2	7.5625	1	7.5000
60-62 400 e.p. gasoline	No sales reported		No sales reported		1	7.5000
64-66 375 e.p. gasoline	No sales reported		No sales reported		No sales reported	
*58-60 437 e.p. gasoline	..	7.125–7.50	..	7.25–7.50	..	7.25–7.50

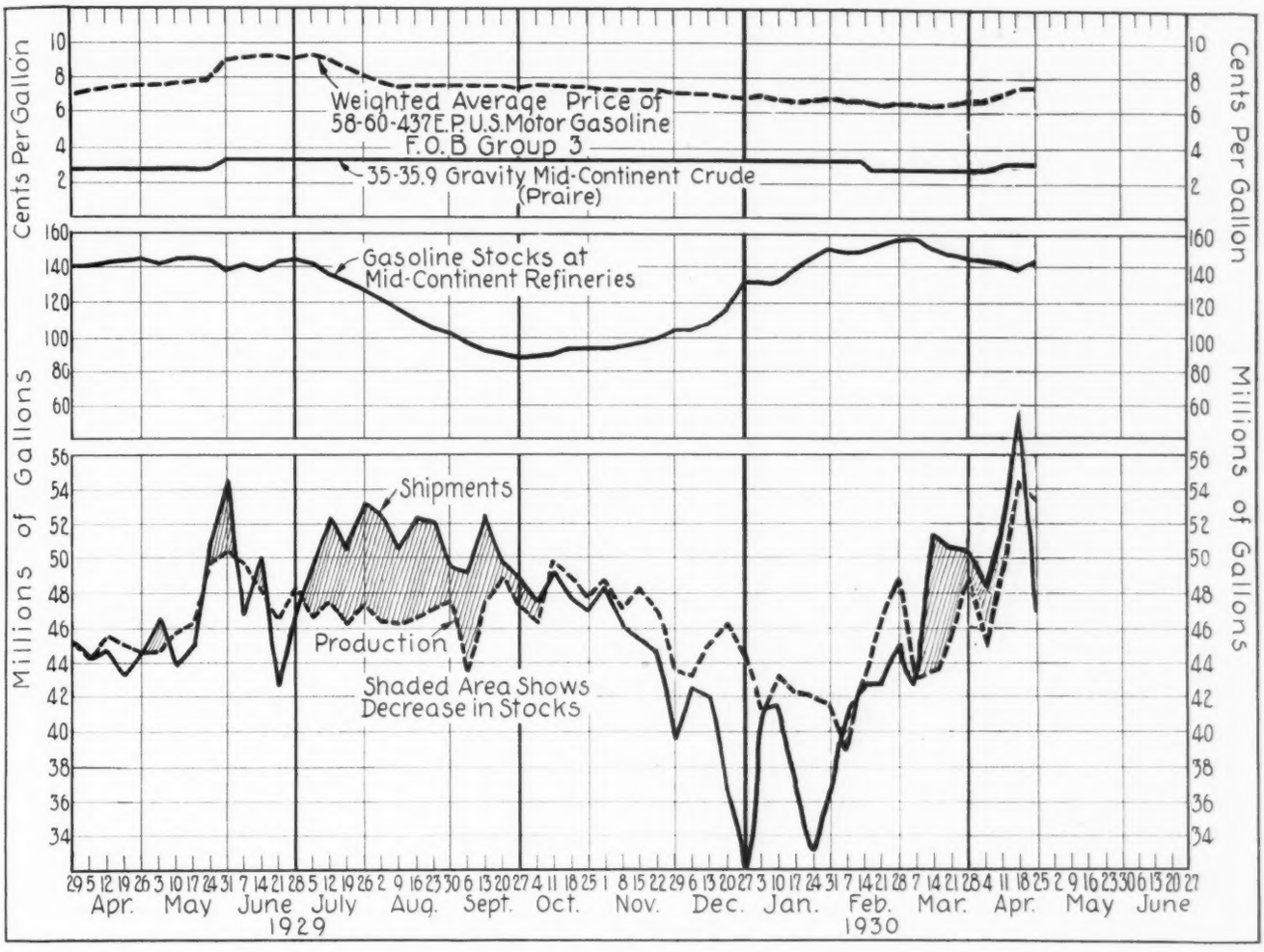
KANSAS

	Apr. 28		Apr. 21		Apr. 14	
	No. of cars	Price	No. of cars	Price	No. of Cars	Price
58-60 U. S. Motor, 437 e.p.	1	7.7500	No sales reported		1	7.7500

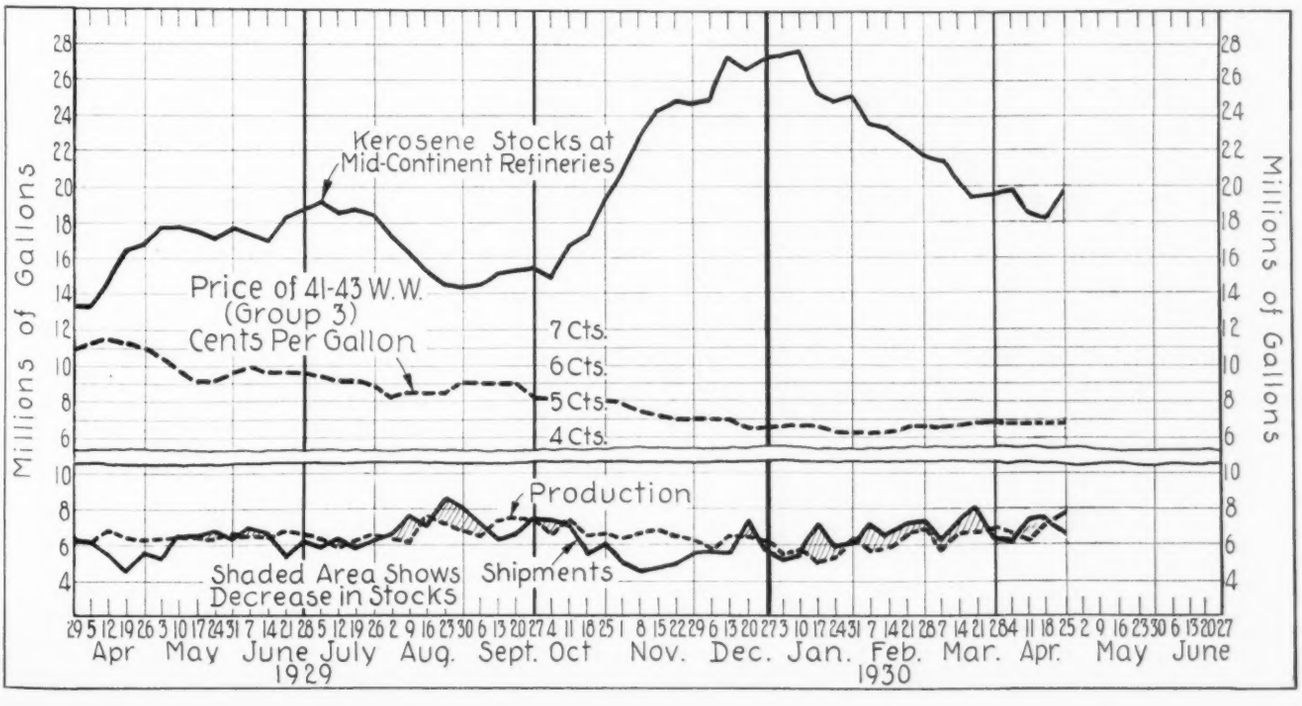
*Full U. S. Motor specifications not guaranteed. Prices represent both quotations and sales.

Barometer of Mid-Continent Refinery Market—Week Ending April 25

Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 93 Plants to National Petroleum News


Cents Per Gallon
Weighted Average Price of 58-60-437 E.P. U.S. Motor Gasoline F.O.B Group 3
35-35.9 Gravity Mid-Continent Crude (Praire)
Gasoline Stocks at Mid-Continent Refineries
Millions of Gallons
Shipments
Production
Shaded Area Shows Decrease in Stocks
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June
1929
1930

Prices shown above are extended to date shown in Refinery Market and Crude tables in Market section of this issue and stocks, shipments and Production are extended to date as shown in the table on page 114



Refinery Markets on Light Oils and Lubricants

Prices given below are in cents per gallon, except where $ is shown

(These Refinery Prices compiled in the OIL PRICE HANDBOOK for a whole year)

GASOLINE AND NAPHTHA

OKLAHOMA (F. o. b. Oklahoma refineries)

	Prices Apr. 28	Prices Apr. 21	Prices Apr. 14
48-50 450 e.p. naphtha	7.00 – 7.25	7.00 – 7.25	7.00 – 7.25
50-52 450 e.p. naphtha	7.125– 7.25	7.125– 7.25	7.125– 7.25
56-58 450 e.p. gasoline	7.125– 7.25	7.125– 7.25	7.125– 7.25
58-60 450 e.p. gasoline	7.25	7.25	7.25
64-66 390 e.p. gasoline	7.75 – 8.00	7.75 – 8.00	7.75 – 8.00
68-70 350-360 e.p. gasoline	8.75	8.75	8.25 – 8.50
‡Domestic Aviation Gasoline	9.50 –10.50	9.50 –10.50	9.50 –10.50

‡Prices based on U. S. Gov't. specifications or better. Present Gov't. specifications require distillation range of 5% recovery at not more than 167° F., and not less than 122° F.; 50% rec. at 221°; 90% at 311°; 96% at 347°; end point, 374°F. Fighting grade in some instances sells at a premium over domestic aviation grade.

PENNSYLVANIA (F. o. b. Western Pennsylvania refineries)

52-54 Naphtha	7.25 – 7.375	7.25 – 7.375	7.25 – 7.375
54-56 Naphtha	7.25 – 7.50	7.25 – 7.50	7.25 – 7.50
58-60 U.S. Motor 437 e.p.	8.00 – 8.50	7.875– 8.25	7.50 – 8.25
60-62 400-410 e.p. gasoline	8.25 – 8.50	8.00 – 8.50	8.00 – 8.50
64-66 390 e.p. gasoline	8.25 – 8.75	8.25 – 8.50	8.25 – 8.50
68-70 350-360 e.p.	8.625– 9.50	8.50 – 9.00	8.50 – 9.00

OHIO (Quotations of S. O. Ohio. 4c state tax to be added.)

U. S. Motor Gasoline

Ohio, delivery at any point	10.50	10.50	10.50

KANSAS (F. o. b. refinery Kansas destination)

60-62 437 e.p. gasoline	7.875	7.875	7.875
60-62 400 e.p. gasoline	8.00	8.00	8.00
64-66 375 e.p. gasoline	8.25	8.25	8.25

NORTH TEXAS (F. o. b. North Texas refineries)

56-58 450 e.p. gasoline	7.00	7.00	7.00
58-60 450 e.p. gasoline	7.00	7.00 – 7.25	7.00 – 7.25
58-60 U.S. Motor 437 e.p.	**7.125– 7.375	**7.25 – 7.50	**7.00 – 7.50
60-62 400 e.p. gasoline	7.50 – 7.75	7.50 – 7.75	7.50 – 7.75
64-66 390 e.p. gasoline	7.875– 8.00	7.875– 8.00	7.875– 8.00
64-66 375 e.p. gasoline	8.00 – 8.25	8.00 – 8.25	8.00 – 8.25
68-70 350-360 e.p. gasoline	8.25 – 8.375	8.25 – 8.375	8.25 – 8.375

****WEST TEXAS** (F. o. b. West Texas refinery, for unrestricted shipment)

50-52 naphtha	7.00	7.00	7.00
58-60 437 e.p. gasoline	7.25	7.25	7.25
58-60 U.S. Motor 437 e.p. gasoline	7.50	7.50	7.50

NORTH LOUISIANA (N. La., Ark. and Miss. destination)

58-60 U.S. Motor 437 e. p.	7.75	7.75	7.50

ARKANSAS (Ark., N. La. and Miss. destination)

58-60 U.S. Motor 437 e.p.	7.75	7.75	7.50

CALIFORNIA (3c tax to be added to California gasoline prices if used in state.)

54-58 U.S. Motor 437 e.p.	8.50 – 9.50	7.00 – 7.75	7.00 – 7.75
54-58 U.S. Motor, for outside state shipment	7.25 – 8.25	6.50 – 7.25	6.25 – 6.75
58-61 375-400 e.p. gasoline	9.50 –10.50	8.50 – 9.50	8.25 – 9.50
42-45 Engine Distillate 445-480 e.p.	7.00 – 8.00	7.00 – 8.00	7.00 – 8.25

NATURAL GASOLINE

(Note: End point of all grades, not over 375 F. Corrosion test adopted Oct. 1, 1927; A.S.T.M. Method D130-27T; doctor test, July 2, 1928.)

OKLAHOMA (F. o. b. Oklahoma refineries)

Grade AA, 80-87.9, 90% Recovery	6.50	6.50 – 6.625	6.50
Grade A, 72-79.9, 90% Recovery	6.625	6.50 – 6.625	6.50
Grade BB, 84-92, 85% Recovery	6.50	6.50 – 6.625	5.50 – 6.00
Grade B, 76-83.9, 85% Recovery	6.50	6.50 – 6.625	5.75 – 6.00
Grade C, 80-92, 78% Recovery	6.50	6.50 – 6.625	5.50 – 6.00

NORTH TEXAS (F. o. b. Breckenridge)

Grade AA, 80-87.9, 90% Recovery	6.50	6.50 – 6.625	6.50
Grade A, 72-79.9, 90% Recovery	6.625	6.50 – 6.625	6.50
Grade BB, 84-92, 85% Recovery	6.50	6.50 – 6.625	5.50 – 6.00
Grade B, 76-83.9, 85% Recovery	6.50	6.50 – 6.625	5.75 – 6.00
Grade C, 80-92, 78% Recovery	6.50	6.50 – 6.625	5.50 – 6.00

NORTH LOUISIANA (F. o. b. Monroe District)

	Prices Apr. 28	Prices Apr. 21	Prices Apr. 14
Grade AA	†7.00	†7.00	†6.75
Grade BB	†6.875	†6.875	†6.00
Grade C	†6.875	†6.875	†6.00

CALIFORNIA (F. o. b. California refineries)

75-85, 375-390 e.p. blend	7.25 – 8.00	7.00 – 8.00	7.00 – 8.00

BURNING OILS

PENNSYLVANIA (F. o. b. Western Pennsylvania refineries)

45 w.w. kerosene	5.625– 5.875	5.625– 6.00	5.625– 6.00
46 w.w. kerosene	5.875– 6.25	5.875– 6.25	5.875– 6.25
47 w.w. kerosene	6.25 – 6.50	6.25 – 6.50	6.25 – 6.50
300 mineral seal	6.75 – 7.00	6.75 – 7.00	6.75 – 7.00

OKLAHOMA (F. o. b. Oklahoma refineries)

41-43 w.w. kerosene	4.25 – 4.50	4.25 – 4.50	4.25 – 4.50
42-44 w.w. kerosene	4.75 – 5.00	4.75 – 5.00	4.75 – 5.00

KANSAS (F. o. b. refinery Kansas destination)

41-43 w.w. kerosene	4.875– 5.00	4.875– 5.00	4.875– 5.00
42-44 w.w. kerosene	5.00 – 5.25	5.00 – 5.25	5.00 – 5.25

NORTH TEXAS (F. o. b. North Texas refineries)

40-42 w.w. kerosene	4.125	4.125	4.125
41-43 w.w. kerosene	4.25	4.25	4.25

NORTH LOUISIANA (N. La., Ark. and Miss. destination)

41-43 w.w. kerosene	5.00	5.00	5.00
42-44 w.w. kerosene	5.25	5.25	5.25

ARKANSAS (Ark., N. La. and Miss. destination)

42-44 w.w. kerosene	5.25	5.25	5.25

CALIFORNIA (F. o. b. California refineries)

38-40 w.w. kerosene	4.00 – 5.00	4.00 – 5.00	3.75 – 4.50

NEUTRAL OIL

PENNSYLVANIA (F. o. b. Western Pennsylvania refineries)

Vis.		(Viscosity at 70° F.)		
200 No. 3 Assoc. Filt.		25.00 –26.00	25.00 –26.00	25.00 –26.00
180 No. 3 Assoc. Filt.		21.00 –22.00	21.00 –22.00	21.00 –22.00
150 No. 3 Assoc. Filt.		15.50 –16.50	15.25 –16.50	15.00 –16.50
			(Non Viscous)	
34 Grav. 330-340 Flash		7.00 – 7.50	7.00 – 7.50	7.00 – 7.50

****OKLAHOMA** (F. o. b. Oklahoma refineries)

Vis.	Color	(Viscosity at 100° F.)		
100	No. 2	6.00 – 7.50	6.00 – 7.50	6.00 – 7.50
150	No. 3	8.00 – 9.00	8.00 – 9.00	8.00 – 9.00
150	No. 4	7.00 – 8.50	7.00 – 8.50	7.00 – 8.50
180	No. 3	9.00 –10.50	9.00 –10.50	9.00 –10.50
180	No. 4	9.00 –10.00	9.00 –10.00	9.00 –10.00
180	No. 5	8.50 – 9.50	8.50 – 9.50	8.50 – 9.50
200	No. 3	12.00	12.00	12.00
200	No. 4	10.00 –11.50	10.00 –11.50	10.00 –11.50
200	No. 5	10.50 –11.00	10.50 –11.00	9.50 –11.00
220	No. 3	12.50 –13.50	12.50 –13.50	12.50 –13.50
220	No. 4	12.00 –12.50	12.00 –12.50	12.00 –12.50
220	No. 5	11.00 –12.00	11.00 –12.00	11.00 –12.00
240	No. 3	13.50 –15.50	13.50 –15.50	13.50 –15.50
240	No. 4	12.50 –14.50	12.50 –14.50	12.50 –14.50
240	No. 5	12.00 –14.00	12.00 –14.00	12.00 –14.00
280	No. 3	17.00 –18.00	17.00 –18.00	17.00 –18.00
280	No. 4	15.00 –17.00	15.00 –17.00	15.00 –17.00
280	No. 5	14.00 –15.50	14.00 –15.50	14.00 –15.50

†Prices nominal ††Only one refiner quoting *Quotations only **Represents Both Sales and Quotations.

Refinery Markets Wax, Lubricants, Heavy Oil

Prices given below are in cents per gallon, except where $ is shown

(For quick reference to Refinery Prices, get the OIL PRICE HANDBOOK, published annually)

GULF COASTAL (F. o. b. Gulf Coastal refineries)

Vis.	Color	Prices Apr. 28	Prices Apr. 21	Prices Apr. 14
		(Viscosity at 100° F., pour test 0)		
100	No. 2 Pale	6.50 – 7.00	6.50 – 7.00	6.50 – 7.00
200	No. 3 Pale	9.50 – 9.75	9.50 – 9.75	9.50 – 9.75
300	No. 3 Pale	10.75 –11.00	10.75 –11.00	10.75 –11.00
500	No. 3½ Pale	12.00 –12.25	12.00 –12.25	12.00 –12.25
750	No. 4 Pale	13.50 –13.75	13.50 –13.75	13.50 –13.75
1200	No. 5 Pale	16.00 –16.50	16.00 –16.50	16.00 –16.50
200	No. 5½ Red Oil	8.75 – 9.00	8.75 – 9.00	8.75 – 9.00
300	No. 5½ Red Oil	10.00 –10.25	10.00 –10.25	10.00 –10.25
500	No. 6 Red Oil	11.25 –11.50	11.25 –11.50	11.25 –11.50
750	No. 6 Red Oil	12.75 –13.00	12.75 –13.00	12.75 –13.00
1200	No. 5-6 Red Oil	15.00 –15.25	15.00 –15.25	15.00 –15.25

‡CALIFORNIA (F. o. b. California refineries)

Vis.	Color	(Viscosity at 100° F.)		
100	No. 3	9.50 –10.00	9.50 –10.00	9.50 –10.00
200	No. 3	11.50	11.50	11.50
300	No. 3	13.00	13.00	13.00
450	No. 3	15.50	15.50	15.50
550	No. 3	16.50	16.50	16.50
600	No. 3	17.00	17.00	17.00
200	No. 5	11.00	11.00	11.00
300	No. 5	12.00	12.00	12.00
400	No. 5	14.00	14.00	14.00
500	No. 5	15.00	15.00	15.00
600	No. 5	16.00	16.00	16.00
700	No. 7	18.00	18.00	18.00

‡Neutral oils not manufactured commercially in California.

CYLINDER STOCKS

****OKLAHOMA** (F. o. b. Oklahoma refineries)

190-200 Vis. D at 210° Brt. St.	‡41.00 –42.00	41.00 –42.00	41.00 –42.00
150-160 Vis. D at 210° Brt. St., 15-20 cold test	‡37.00	37.00	37.00
150-160 Vis. D Brt. Stock, 25-45 cold test	‡36.00 –36.50	36.00 –36.50	36.00 –36.50
150-160 Vis. E 210° Brt. St.	‡34.00 –35.00	34.00 –35.00	35.00 –36.00
600 St. Ref. Olive Green	‡9.00 –10.00	9.00 –10.00	9.00 –10.00
500 St. Ref. Dark Green	‡9.00	9.00	9.00
Black Oil	5.00	5.00	5.00

‡Prices represent quotations and sales to domestic jobbers only.

PENNSYLVANIA (F. o. b. Western Penna. refineries) (A.S.T.M. Tests)

600 Steam Refined, filterable	23.50 –24.50	23.50 –24.50	23.50 –24.50
650 Steam Refined	29.00 –31.00	29.00 –31.00	29.50 –31.00
600 Flash	31.00 –33.00	31.00 –33.00	31.00 –33.00
630 Flash	35.00 –36.50	35.00 –36.50	35.00 –36.50
600 Warren E	29.50 –30.00	29.50 –30.00	29.50 –30.00
600 Oil City E	29.00 –29.50	29.00 –29.50	28.50 –29.50
500 D Filtered	34.00 –35.00	34.00 –35.00	34.50 –35.00
Cold Test Stock, 40-50 p. p., 140-150 vis. at 210° 540-550 flash, No. 8 color	39.00 –41.00	39.00 –41.00	39.50 –41.00
40-50 p.p., 140-150 vis. at 210°, 540-550 flash, No. 6-6½ color diluted	38.00 –40.00	38.50 –40.00	38.50 –40.00

WAX

PENNSYLVANIA (Per pound, F. o. b. New York)

122-124 white crude scale, a.m.p.	2.60 – 2.625	2.625	2.625– 2.75
124-126 white crude scale, a.m.p.	2.60 – 2.625	2.625	2.625– 2.75

****OKLAHOMA** (Per pound in barrels; in a ew instances, per pound in burlap bags; F. o. b. Oklahoma refineries)

124-126 White Crude Scale, a.m.p.	2.375	2.375– 2.50	2.375– 2.50

DISTILLATE, GAS AND FUEL OIL

PENNSYLVANIA (For outside Pittsburgh district)

36-40 fuel oil	4.00 – 4.375	4.00 – 4.375	4.00 – 4.50
30-34 fuel oil	4.00 – 4.125	4.00 – 4.125	4.00 – 4.25
28-32 fuel oil	4.00 – 4.125	4.00 – 4.125	4.00 – 4.25

OKLAHOMA (F. o. b. Oklahoma refineries)

38-40 straw distillate	3.00 – 3.25	3.00 – 3.25	3.00 – 3.25
36-38 straw distillate	2.875	2.875	2.875
32-36 straw gas oil	2.50 – 2.75	2.50 – 2.75	2.50 – 2.75
32-36 straw gas oil zero	3.00	3.00	3.00
32-36 dark gas oil	2.375– 2.50	2.375– 2.50	2.375– 2.50
32-36 dark gas oil zero	2.50 – 2.75	2.50 – 2.75	2.50 – 2.75
28-30 zero fuel oil (per bbl.)	$0.90 – 0.95	$0.90 – 0.95	$1.05 – 1.10
28-30 fuel oil (per bbl.)	$0.875– 0.90	$0.875– 0.90	$0.95 – 1.00
26-28 fuel oil (per bbl.)	$0.825– 0.875	$0.825– 0.875	$0.85 – 0.95
24-26 fuel oil (per bbl.)	$0.775– 0.80	$0.775– 0.80	$0.80 – 0.85
22-26 fuel oil (per bbl.)	$0.70 – 0.75	$0.70 – 0.75	$0.725– 0.775
18-22 fuel oil (per bbl.)	$0.60 – 0.65	$0.625– 0.675	$0.625– 0.675
16-20 fuel oil (per bbl.)	$0.55 – 0.60	$0.55 – 0.60	$0.55 – 0.60
14-16 fuel oil (per bbl.)	$0.50 – 0.575	$0.50 – 0.60	$0.50 – 0.60

KANSAS (F. o. b. refinery Kansas destination)

38-40 straw distillate	3.50 – 3.75	3.50 – 3.75	3.50 – 3.75
36-38 straw distillate	3.25	3.25	3.25
32-36 straw gas oil	3.25 – 3.50	3.25 – 3.50	3.25 – 3.50
18-22 fuel oil (per bbl.)	$0.80 – 0.85	$0.80 – 0.85	$0.80 – 0.85
10-14 fuel oil (per bbl.)	$0.725– 0.775	$0.725– 0.775	$0.725– 0.775

NORTH TEXAS (F. o. b. North Texas refineries)

38-40 straw distillate	3.00 – 3.25	3.00 – 3.25	3.00 – 3.25
38-40 p.w. treated distillate	3.25	3.25	3.25
32-36 gas oil, cracked	2.50	2.50	2.50
32-36 St. reduced gas oil	2.375– 2.50	2.375– 2.50	2.25 – 2.50
24-26 fuel oil (per bbl.)	$0.60 – 0.65	$0.60 – 0.65	$0.60 – 0.65
20-24 fuel oil (per bbl.)	$0.55	$0.55	$0.55
18-22 fuel oil (per bbl.)	$0.45 – 0.50	$0.50	$0.50

****WEST TEXAS** (F. o. b. West Texas refinery, for unrestricted shipment)

34-38 gas oil	2.50 – 2.75	2.50 – 2.75	2.50 – 2.75
30-32 gas oil	2.25 – 2.50	2.25 – 2.50	2.25 – 2.50
28-30 zero gas oil	2.50 – 2.875	2.50 – 2.875	2.50 – 2.875
18-22 fuel oil (per bbl.)	$0.60 – 0.80	$0.60 – 0.80	$0.60 – 0.80

NORTH LOUISIANA (N. La., Ark. and Miss. destination)

32-36 gas oil, dark	3.00	3.00	3.00
30-32 gas oil, straw	3.00	3.00	3.00
14-16 fuel oil (per bbl.)	$0.75 – 0.85	$0.75 – 0.85	$0.75 – 0.85

ARKANSAS (Ark., N. La. and Miss. destination)

30-32 gas oil, straw	2.75	3.00	3.00
32-36 dark gas oil	2.75	3.00	3.00
28-30 gas oil	2.50	2.75	2.75
20-24 fuel oil (per bbl.)	$0.95	$0.95	$0.95
9-12 fuel oil (per bbl.)	$0.75	$0.75	$0.75
Black oil	3.25	3.25	3.25

CALIFORNIA (F. o. b. San Joaquin Valley. Nominal pipe line charge to San Francisco 24c per bbl. more and to San Pedro 20c per bbl. more.)

14-18 fuel oil (per bbl.)	$0.50 –$0.65	$0.50 –$0.65	$0.45 –$0.60
14-18 Bunker oil (per bbl.)	$0.70 –$0.75	$0.70 –$0.75	$0.70 –$0.75
30-34 gas oil (per bbl.)	$0.85 –$1.05	$0.80 –$0.95	$0.70 –$0.90
27 Plus Diesel oil (per bbl.)	$0.85 –$1.00	$0.80 –$0.95	$0.70 –$0.90

PETROLATUMS

PENNSYLVANIA (Per pound, in barrels, carload lots, f. o. b. refinery. In tank cars ⅛c to ¼c per pound less.) Two refiners quoting.

Snow White	8.25 – 8.50	8.25 – 8.50	8.25 – 8.50
Lily White	7.25 – 7.50	7.25 – 7.50	7.25 – 7.50
Cream White	6.25 – 6.50	6.25 – 6.50	6.25 – 6.50
Light Amber	3.50 – 3.625	3.50 – 3.625	3.50 – 3.625
Amber	3.25 – 3.375	3.25 – 3.375	3.25 – 3.375
Red	3.00	3.00	3.00

PETROLEUM COKE

****OKLAHOMA** (F. o. b. Oklahoma refineries)

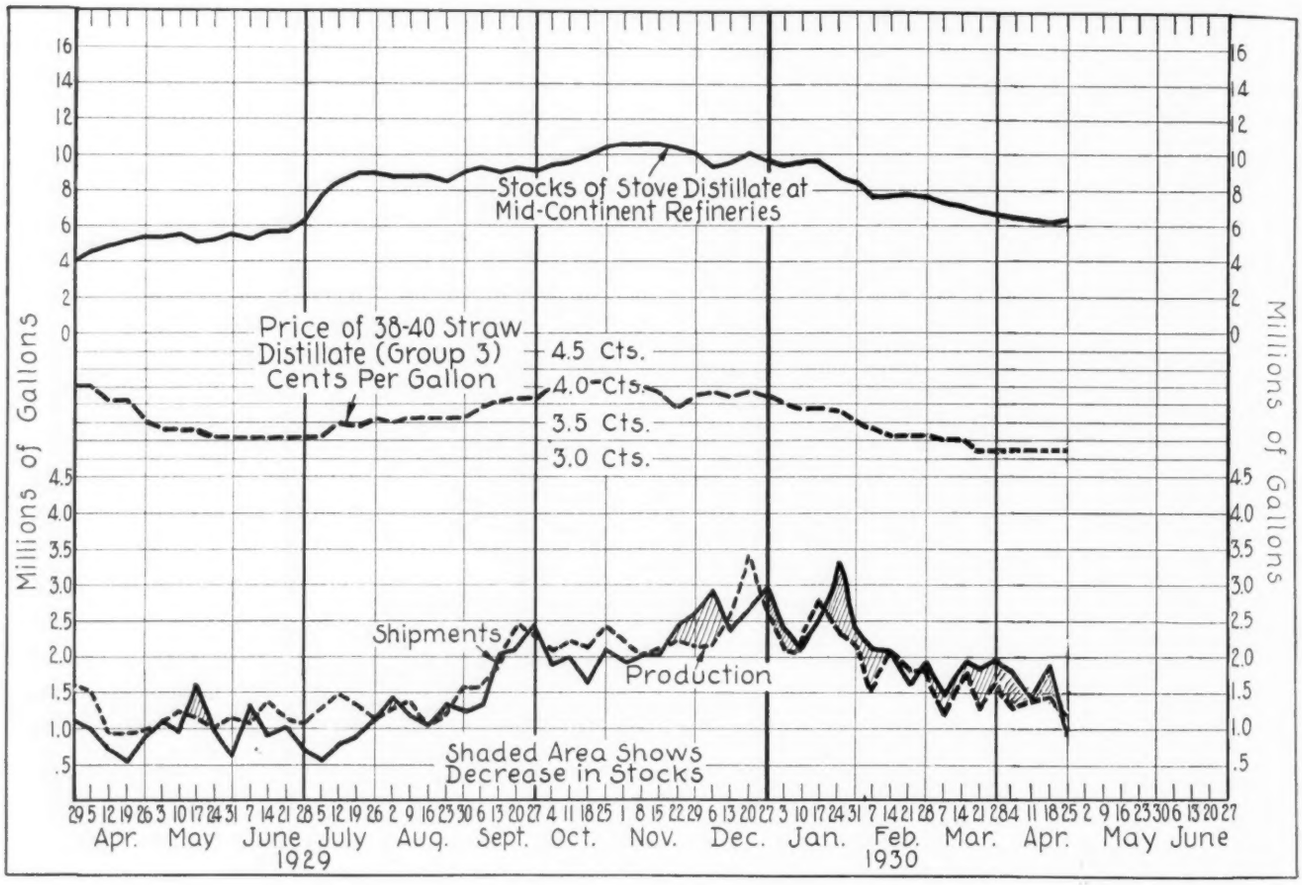
(Per ton in car lots)

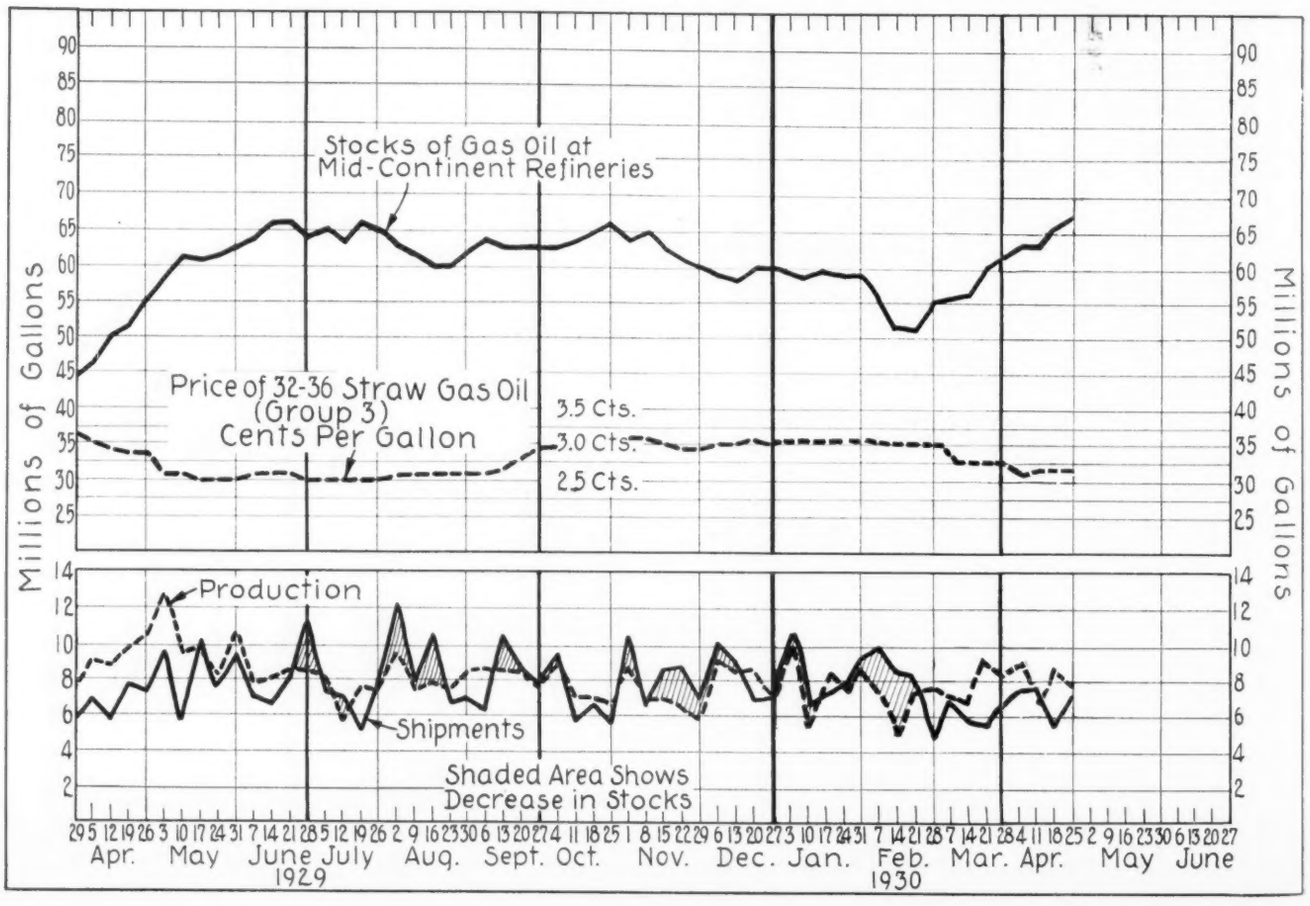
Lump	$4.50 – 5.00	$4.50 – 5.00	$4.50 – 5.00
Still run	$3.00	$3.00	$3.00
Breeze	$2.00	$2.00	$2.00

†Prices nominal ††Only one refiner quoting *Quotations only **Represents Both Sales and Quotations.

Barometer of Mid-Continent Refinery Market—Week Ending April 25

Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 93 Plants to National Petroleum News


Stocks of Stove Distillate at Mid-Continent Refineries
Price of 38-40 Straw Distillate (Group 3) Cents Per Gallon
4.5 Cts.
4.0 Cts.
3.5 Cts.
3.0 Cts.
Shipments
Production
Shaded Area Shows Decrease in Stocks
Millions of Gallons
Millions of Gallons
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June
1929
1930


Stocks of Gas Oil at Mid-Continent Refineries
Price of 32-36 Straw Gas Oil (Group 3) Cents Per Gallon
3.5 Cts.
3.0 Cts.
2.5 Cts.
Production
Shipments
Shaded Area Shows Decrease in Stocks
Millions of Gallons
Millions of Gallons
Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June
1929
1930

LOWER the Service Station Payroll by 25%

Increase the Average Sale of Gasoline by 40%

A TYPICAL large one-stop super service station in a mid-western city recently replaced its old-style visible and blind gasoline pumps with modern *metered pumps.* This change reduced the station payroll from eight men to six men . . . a clear saving of at least $200.00 monthly. At the same time the gallonage increased 40% . . . for it took less time and labor for service, and each customer was sold a few more gallons.

And when you buy meter pumps . . . be sure they are equipped with Buffalo Gasoline Meters. For . . .

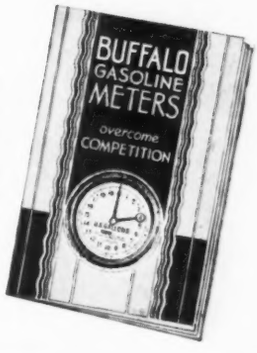
They are of the positive displacement nutating piston type . . . the simplest in design of any meter . . . with fewer working parts, longer life and more sustained accuracy.

Buffalo Gasoline Meters are leaders in the field of gasoline retailing meters. They are backed by the 38 year reputation of the Buffalo Meter Company . . . a company whose sole efforts and engineering has been devoted to the pioneering and development of liquid meters.

Buffalo Gasoline Meters are built in large quantities and are used by some of the largest pump manufacturers.

Learn the full story of how Buffalo Gasoline Meters overcome competition. It is interestingly told in the new Buffalo Gasoline Meter Book . . . just published, and which contains information of value to the Super Service Station owner . . . sent without the least obligation. Use the coupon. Buffalo Meter Company, 2889 Main Street, Buffalo, New York.

The name of Buffalo-Made Meters has recently been changed from "Niagara Gasoline Meters" to "Buffalo Gasoline Meters."



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TRADE MARK REG U.S. PAT OFF.

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Please send us without obligation a copy of your new book entitled "Buffalo Gasoline Meters Overcome Competition," telling the full story of gasoline retailing meters.

Individual_____

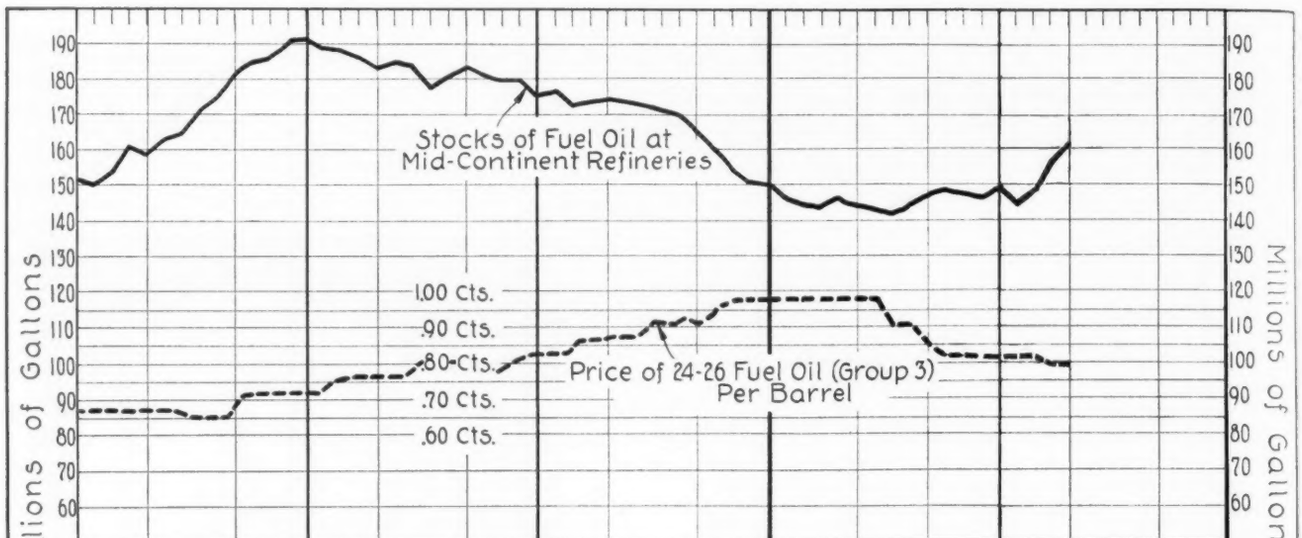
Firm Name_____

Street address or P. O. box_____

City_____ State_____

Barometer of Mid-Continent Refinery Market—Week Ending April 25

Charted Course of Prices, Production, Shipments, Stocks of Principal Refined Products, Week by Week, From Reports Made by 93 Plants to National Petroleum News



California Refinery Market

Better Retail Markets Help T.C. Prices

LOS ANGELES, April 26

ALTHOUGH a few scattered inquiries for export gasoline were reported by members of the California trade there continued to be an absence of actual spot sales during the past week. Interests of refiners on the Pacific Coast centered largely on a readjustment of the local retail situation which is covered elsewhere in this issue of NATIONAL PETROLEUM NEWS.

Effective April 23, Standard Oil Co. of California posted a price of 6.50 cents per gallon for U. S. Motor gasoline, in cargo lots, f.o.b. vessels at San Pedro. This action, which includes the quotation of prices for higher grades of gasoline upon application by the seller, was taken by the California trade as a substantial move toward stabilizing the domestic and export gasoline markets.

Reports of bids on Pacific Coast Navy petroleum requirements for the coming year indicated an improvement in the fuel oil market. It was reported a bid of $0.535 per barrel was received for 700,000 barrels and another of $0.59 for 300,000 barrels. Low bids on the remainder of the 4,000,000-barrel fuel oil contract were $0.64 for 2,000,000 barrels and $0.70 for 1,000,000 barrels. The low bidder on 70,000 barrels of diesel oil was reported to have been $0.87 per barrel.

Members of the California trade read into the future a much brighter outlook for the fuel oil market as a result of these comparatively high prices. One or two refiners reported a better demand for fuel oil with quotations slightly higher but generally speaking improvement existed only as a prediction.

The local tank car market showed considerable improvement the last of the week which was attributed by a majority of the trade to the better retail situation.

U. S. Motor for consumption within the state moved at 8.50 to 9.50 cents without tax. A few scattered tank cars sold as low as 8.25 cents.

Independent refiners who have unloaded considerable distress gasoline in the out of state market at very low prices, raised their quotations for shipment into adjoining states. Quotations ranged from 7.25 to 8.25 cents, with a few spot sales made at between 7 and 7.25 cents.

Quotations for other oils remained practically unchanged during the week with the exception of natural gasoline and burning oils. Several members of the local trade reported a slight improvement in absorption gasoline quotations. The asked price for this commodity ranged from 7.25 to 8 cents. Kerosene, which has held the cellar position in California markets during the past few months, was reported in slightly better demand with quotations ranging from 4 to 5 cents. One dealer, however, reported he could buy all of this commodity he wanted at 3.75 cents.

Kerosene-distillate could be bought as low as 2 cents a gallon although a majority of the trade were quoting in the neighborhood of 2.75 cents.

Pennsylvania Market

U. S. Motor Advances 0.25 Cent

CLEVELAND, April 28.—Gasoline prices continued to push forward in the western Pennsylvania market last week. Little change was noted in quotations for other oils and demand, generally speaking was relatively light.

Activity in the gasoline market was confined pretty much to buying for future delivery. The demand for this class of business continued unabated throughout the week with the result that a number of large sellers reported they would be out of the market during the first half of May and several asserted they would have no gasoline to offer until June 1.

The active future market naturally had a stiffening effect on the spot market for gasoline. U. S. Motor under 8 cents was practically nil as a market factor by the end of the week and the few sellers quoting this price were offering only for immediate shipment.

High gravity gasolines also moved up 0.125 to 0.25 cent a gallon. The Canadian demand failed to show any appreciable improvement, however, with the result that these grades were rather sluggish.

There was little change noted either in prices or demand for kerosene. The 45 w.w. grade still was freely available at 5.625 cents but in spite of considerable surplus material which was said to be hanging over the market, the price failed to break through this level.

The purchase of approximately 200 cars of fuel oil at around 4 cents a gallon by a large refiner for cracking stock placed the market for this commodity in a much better position. Spot fuel oil of from 28 to 36 gravity still was obtainable at 4 cents but in view of this purchase, several traders predicted an advance from this level within a week or 10 days.

Neutral oils and steam refined cylinder stocks remained relatively tight. Prices were steady. Some slightly off specification 150 No. 3 color neutral was offered at around 15 cents a gallon, but 15.50 cents was the low for strictly specification material.

Bright stock remained quiet. No. 6-6½ color diluted oil was offered 0.5 cent lower at 38 cents and No. 8 color stock was available in one or two directions at 39 cents for immediate shipment, but aside from this there was little change in this section of the market.

Demand for wax was dull. Both the 122-124 and 124-126 A.m.p. grades of white crude scale sold a few points lower at 2.60 cents per pound, New York. At the end of the week, buyers were bidding 2.375 to 2.50 cents, New York.

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Eastern Domestic Markets

Gasoline Prices Point Upward

Staff Special
NEW YORK, April 26

GASOLINE markets along the eastern seaboard were unsettled at the end of the past week as refiners contemplated adjustments to higher price levels. The majority of quotations remained at last week's levels, however. Prices for other oils also were unchanged in all markets.

With May just around the corner and several buyers indicating a willingness to purchase gasoline for that period several refiners were giving greater attention to the price situation. One or two sellers in the New York market advanced their quotations and several others in various districts contemplated similar action.

Refiners in the New York area were more concerned with an increase in price than those of other districts. The situation in this market, while much improved over a few weeks back, still presents quite a problem, the trade reported. Many of the trade have been selling in competition with the tank wagon contract market. This has held prices at New York at relatively low levels and these traders were cautious about raising their spot tank car prices for fear of losing their best buyers.

However, from several quarters came the report that orders were increasing and many jobbers had signified they wished to purchase their requirements for May. On the strength of this, one refiner at New York raised his price 0.25 cent and others indicated they might advance their prices a like amount early next week. One refiner had quoted 8.50 cents—an increase of 0.25 cent over his former price—on two fair-sized orders for May, but up to the end of the week had not been notified whether his offer was accepted or rejected. He intended to base his price for the immediate future on the outcome of these two quotations.

In other districts refiners also were considering raising their prices, although in some sections May orders were not coming in very well. New England refiners reported they were basing most of their May sales on the tank wagon market in order to be protected if tank wagon prices increased as anticipated. One Boston refiner quoted on the basis of 8 cents Bayonne for shipment from Boston into Connecticut because of competition from New York harbor. Freight from Boston to a majority of Connecticut points is fractionally under that from New York harbor to the same points.

Some shading of posted prices at Philadelphia reported early in the week was being eliminated at the end, several sellers said. Gasoline still was available at 8.25 cents although several sellers indicated they would not quote that price for forward shipment. At more southern points along the seaboard markets were in better shape due to warmer weather.

California gasoline prices also were unchanged but were in line for an increase along with regular U. S. Motor. One supplier at New York advanced his price to 9 cents although 8.50 cents still could be done. Another supplier continued to ask 9.75 cents for shipment from New York harbor. A Baltimore seller had quoted the current market to one account over May but indicated that if suppliers in that district raised their quotations he would do likewise.

The eastern trade has taken the announcement of a posted price for California gasoline on the west coast, as a criterion of more stable and probably higher markets in the east. They believed that much of the distress gasoline which very often is dumped on the Atlantic coast would be eliminated, and refiners would not have to compete with low priced gasoline from that source.

Other commodities generally were unchanged. While most refiners were quoting kerosene within the range of 7.25 to 7.75 cents, some shading was reported.

Gulf Coast Markets

Activity at Low Ebb; Prices Steady

Staff Special
NEW YORK, April 26

ACTIVITY in Gulf markets was at low ebb the past week. Prices for all oils were unchanged although there was a report current that the base price for Bunker C fuel oil contracts was to be increased. An inquiry from a domestic buyer for a small shipment of light oil was reported.

The report was heard April 26 that the Standard of New Jersey and other companies operating at the Gulf were to increase the price basis of fuel oil to ship owners in the near future. This increase would apply to future contracts.

The report was given confirmation but no definite information could be gleaned as to the amount of the increase nor the date it would be effective.

Several of the trade said the increase would be the natural result of better conditions in the industry, and of the recent advance in spot prices at the Gulf and on the Atlantic Seaboard.

An east coast buyer was reported to be seeking a cargo of 26-30 low sulfur gas oil late in the week but this report lacked confirmation. The buyer needed only 16,000 barrels to fill his storage it was reported and it was for this amount he inquired for quotations.

The inquiries from France and England for gasoline which came into the market three weeks ago still had not been placed up to the end of the past week. Several of the trade said the buyers who did not make purchases were interested only in obtaining bargains and when none were found, they withdrew from the market. Very little, if any, gasoline was believed available in the Mid-Continent at prices under those posted by the Export Petroleum Association and California refiners were reported in better shape than for some weeks.

Just when there would be a resumption of foreign activity many of the trade were at a loss to say, but it was the general opinion that the requirements of most foreign companies had been covered on for the summer months and these accounts probably would not be in the market before the middle of the summer when they would purchase their fall gasoline.

Gulf Lube Prices Hold

HOUSTON, April 28.—Conditions were unchanged and prices remained frozen at recent levels in the Gulf Coastal lubricant markets, according to Houston district manufacturers. Normal spring demand continued for spot shipments in tank cars. Inquiries for export goods were reported slow the past week.

Wax Markets

White Crude Scale Eases Off

NEW YORK, April 26.—Prices for several grades of wax were lower in the New York and New Orleans markets at the end of the past week. Market conditions were much the same as the previous week with demand light and low prices being bid by foreign buyers.

Toward the end of the week white crude scale prices at New York eased off a fraction of a cent to 2.55 cents f.a.s. the harbor. Small lots were available at this figure while many refiners quoted 2.625 cents.

Also in the New York market 130-132 A.m.p. fully refined and 135-137 A.m.p. fully refined prices were 0.25 cent lower. A decrease of 0.125 cent in quotations for 130-132 A.m.p. fully refined was made by Gulf refiners.

Crude scale markets were very inactive and conditions were similar to those of the past two or three weeks governed the small volume of trading done toward the end of the week. Buyers from the United Kingdom bid 2.50 cents f.a.s. New York harbor, for small lots but were unsuccessful in getting offers at that figure. An east coast refiner reported he had quoted a broker 2.50 cents for a small lot of white crude scale for shipment from New York, but that his quotation was high compared with what the broker's account wished to pay and the sale was not made. He quoted 2.625 cents f.a.s. New York, with the exception of this one instance and said he would not quote for anything but prompt shipment.

Other refiners, both on the seaboard and in Pennsylvania representing the majority, were reported operating on the same basis and several traders believed a little buying would clean up the offerings below 2.625 cents. One large eastern refiner quoted 2.75 cents for scale.

Yellow crude scale prices remained at 2.50 cents both at New York and the Gulf although there were some traders of the opinion this price might be shaded with firm business. Very little business has been transacted in the yellow wax market in the past few weeks, however, and several reported it was hard to determine just what the market would be if sellers were to quote on actual business.

Stocks of the two grades of fully refined wax which were quoted at lower prices were reported leaning toward the heavy side despite the fact that most refiners reported a good movement against contracts. The Spanish Monopoly order for 700 tons of 125-127 A.m.p. fully refined which was taken by an east coast refiner at a price slightly in excess of 3.75 cents, has served to strengthen that grade somewhat.

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Complete Seaboard Market

(Export Markets for whole year given in OIL PRICE HANDBOOK. Each volume carries refinery, tank wagon, crude and export markets complete for the whole year)

Eastern Domestic Market

(Prices for tank car lots, f. o. b. refinery or seaboard terminal, representing majority of sales and quotations. Prices shown below do not include inspection tax levied in some states.)

U. S. MOTOR GASOLINE	Prices Apr. 28	Prices Apr. 21	Prices Apr. 14
New York harbor	†8.00 – 8.50	†8.00 – 8.50	†8.00 – 8.50
Portland district	*9.80	*9.80	*9.80
Boston district	*9.50	*9.50	*9.50
Providence district	*9.50	*9.50	*9.50
Philadelphia district	8.25 – 8.50	8.25 – 8.50	8.25 – 8.50
Baltimore district	8.25 – 8.50	8.25 – 8.50	8.25 – 8.50
Norfolk district	8.25 – 8.50	8.25 – 8.50	8.25 – 8.50
Charleston district	8.25 – 8.50	8.25 – 8.50	8.25 – 8.50
Savannah district	8.25 – 8.50	8.25 – 8.50	8.25 – 8.50
Jacksonville district	8.25 – 8.50	8.25 – 8.50	8.25 – 8.50
CALIFORNIA, U. S. MOTOR GASOLINE			
New York harbor	†8.50 – 9.00	†8.50 – 9.00	†8.50 – 9.00
Philadelphia district	8.50	8.50	8.50
Baltimore district	8.50	8.50	8.50
‡DOMESTIC AVIATION GASOLINE			
New York harbor	11.50 –12.50	11.50 –12.50	11.50 –12.50
Philadelphia	11.50	11.50	11.50
Baltimore	11.50 –12.50	11.50 –12.50	11.50 –12.50
Boston	11.50 –12.50	11.50 –12.50	11.50 –12.50

‡Prices are based on U. S. Gov't. specifications or better. Present Gov't. specifications require distillation range of 5% recovery at not more than 167° F., and not less than 122°F.; 50% recovery at 221°; 90% at 311°; 96% at 347°; end point 374° F. Gasoline of fighting grade specifications in some instances sells at a premium over domestic aviation grade. Prices represent majority of quotations.

WATER WHITE KEROSENE			
New York harbor	7.25 – 7.75	7.25 – 7.75	7.25 – 7.75
Philadelphia district	7.25 – 7.75	7.25 – 7.75	7.25 – 7.75
Baltimore district	7.25 – 7.75	7.25 – 7.75	7.25 – 7.75
GAS OIL: 28-34 Gravity			
New York harbor	4.75 – 5.25	4.75 – 5.25	4.75 – 5.25
Boston district	4.75 – 5.25	4.75 – 5.25	4.75 – 5.25
FURNACE OIL: 36-40 Gravity			
New York harbor	6.00 – 6.25	6.00 – 6.25	6.00 – 6.25
Boston district	6.00 – 6.25	6.00 – 6.25	6.00 – 6.25
GRADE C BUNKER OIL (Lighterage 5c per bbl. additional)			
New York Harbor	$1.15	$1.15	$1.15
Boston district	$1.15	$1.15	$1.15
DIESEL OIL			
New York harbor	$2.00 –$2.10	$2.00 –$2.10	$2.00 –$2.10

*Minimum delivered. †Nominal. **Delivered prices.

New York Export Market

(Lubricating oils are per gal. in bbls. F.a.s. New York)

	Apr. 28	Apr. 21	Apr. 14
CYLINDER OILS (Pennsylvania Products)			
Bright stock, dark	45.00 –47.00	45.00 –47.00	45.00 –47.00
600 D filtered	38.75 –40.00	38.75 –40.00	38.75 –40.00
600 Warren E filtered	35.00 –37.00	35.00 –37.00	35.00 –37.00
600 s.r. unfiltered	28.50 –29.50	28.50 –29.50	28.50 –29.50
650 s.r. unfiltered	35.00 –37.00	35.00 –37.00	35.00 –37.00
600 flash, s.r.	37.50 –40.00	37.50 –40.00	37.50 –40.00
630 flash, s.r.	42.50 –44.00	42.50 –44.00	42.50 –44.00
RED ENGINE OILS (Vis. 100°)			
300 vis. No. 6½ color	20.00 –21.00	20.00 –21.00	20.00 –21.00
250 vis. No. 6 color	17.50 –18.50	17.50 –18.50	17.50 –18.50
200 vis. No. 6 color	16.50 –17.50	16.50 –17.50	16.50 –17.50
PALE ENGINE OILS (Vis. 100°)			
230 vis. No. 3¾ color	23.00 –24.00	23.00 –24.00	23.00 –24.00
180 vis. No. 3¼ color	19.00	19.00	19.00
100 vis. No. 2¼ color	15.50 –16.00	15.50 –16.00	15.50 –16.00
MOTOR OILS (Vis. 100°)			
600 vis. No. 7 color	30.00	30.00	30.00
500 vis. No. 6½ color	26.50 –27.50	26.50 –27.50	26.50 –27.50
400 vis. No. 7¼ color	23.00 –25.00	23.00 –25.00	23.00 –25.00
300 vis. No. 6 color	20.00 –22.00	20.00 –22.00	20.00 –22.00
200 vis. No. 6 color	18.00 –20.00	18.00 –20.00	18.00 –20.00

Wax Markets

(Prices in cents per pound, A.S.T.M. tests; A.M.P. F.a.s. carload lots)

NEW YORK	Apr. 28	Apr. 21	Apr. 14
124-126 Yellow crude scale	2.50	2.50	2.50 – 2.625
122-124 White crude scale	2.55 – 2.625	2.625	2.625– 2.75
124-126 White crude scale	2.55 – 2.625	2.625	2.625– 2.75
123-125 Fully refined	3.50 – 3.625	3.50 – 3.625	3.50 – 3.625
125-127 Fully refined	3.75 – 3.875	3.75 – 3.875	3.625– 3.875
128-130 Fully refined	4.00 – 4.125	4.00 – 4.125	4.00
130-132 Fully refined	4.25 – 4.50	4.50	4.50
133-135 Fully refined	5.00 – 5.25	5.00 – 5.25	5.00 – 5.25
135-137 Fully refined	5.50	5.50 – 5.75	5.50 – 5.75
NEW ORLEANS			
124-126 Yellow crude scale	2.50	2.50	2.50 – 2.625
122-124 White crude scale	2.50 – 2.625	2.50 – 2.625	2.50 – 2.75
124-126 White crude scale	2.50 – 2.625	2.50 – 2.625	2.50 – 2.75
123-125 Fully refined	3.50	3.50	3.50
125-127 Fully refined	3.75	3.75	3.625– 3.75
128-130 Fully refined	4.00	4.00	3.875– 4.00
130-132 Fully refined	4.25 – 4.375	4.375	4.375
133-135 Fully refined	5.00 – 5.25	5.00 – 5.25	5.00 – 5.25

Gulf Export Market

(Prices are f. o. b. Gulf oil terminals in Texas and Louisiana, shipments of 20,000 bbls. or more unless otherwise noted. Bulk gasoline and kerosene prices are posted quotations of the Export Petroleum Assoc., Inc., governing about 90% of the gasoline and kerosene shipped to foreign ports from the Gulf)

GASOLINE	Prices Apr. 28	Prices Apr. 21	Prices Apr. 14
U. S. Motor	8.00	8.00	8.00
60-62, 400 e.p.	9.00	9.00	9.00
61-63, 390 e.p.	9.25	9.25	9.25
64-66, 375 e.p.	9.50	9.50	9.50
U. S. Motor, cases (cargoes)	$1.85	$1.85	$1.85
64-66, cases (cargoes)	$2.00	$2.00	$2.00
KEROSENE			
44 water white	7.00	7.00	7.00
41-43 prime white	6.00	6.00	6.00
Water white, cases (cargoes)	$1.75	$1.75	$1.75
Prime white, cases (cargoes)	$1.65	$1.65	$1.65
DOMESTIC GAS & BUNKER OILS			
*26-30 translucent gas oil	3.50 – 3.75	3.50 – 3.75	3.50 – 3.75
*30 plus translucent gas oil	3.875– 4.00	3.875– 4.00	3.875– 4.00
Grade C bunker oil	$1.05	$1.05	$1.05
Grade C bunker oil, cargoes	$0.75 –$0.80	$0.75 –$0.80	$0.75

*Less than ½ of 1% sulphur

MEXICAN CRUDE AND BUNKER OILS (f. o. b. Steamer, Tampico)			
Heavy Panuco crude taxes to be paid	$0.70	$0.70	$0.70
Grade C bunker oil for bunkering purposes, taxes paid	$1.00	$1.00	$1.00
SOUTH TEXAS LUBRICATING OILS (Viscosity at 100°F. cold test 0 Tanker, f. o. b. Houston)			
100 vis. No. 2 unfiltered pale	5.75 – 6.00	5.75 – 6.00	5.75 – 6.00
200 vis. No. 3 unfiltered pale	8.00 – 8.50	8.00 – 8.50	8.00 – 8.50
300 vis. No. 3 unfiltered pale	8.875– 9.50	8.875– 9.50	8.875– 9.50
500 vis. No. 3½ unfiltered pale	10.25 –11.25	10.25 –11.25	10.25 –11.25
750 vis. No. 4 unfiltered pale	12.50 –12.75	12.50 –12.75	12.50 –12.75
1200 vis. No. 5 unfiltered pale	16.00 –18.00	16.00 –18.00	16.00 –18.00
200 vis. No. 5-6 red oil	7.00 – 7.25	7.00 – 7.25	7.00 – 7.25
300 vis. No. 5-6 red oil	8.375– 8.50	8.375– 8.50	8.375– 8.50
500 vis. No. 5-6 red oil	9.25 – 9.50	9.25 – 9.50	9.25 – 9.50
750 vis. No. 5-6 red oil	11.50	11.50	11.50
1200 vis. No. 5-6 red oil	15.00 –15.25	15.00 –15.25	15.00 –15.25

Gulf Domestic Market

(Prices are f.o.b. Gulf oil terminals in Texas and Louisiana in shipments of 20,000 bbls. or more, representing sellers' opinions, for domestic shipment only.)

	Apr. 28	Apr. 21	Apr. 14
U. S. Motor gasoline	7.50	7.50	7.00 – 7.50
41-43 w.w. kerosene	5.875– 6.25	5.875– 6.25	5.875– 6.25
*26-32 translucent gas oil	3.75 – 4.00	3.75 – 4.00	3.75 – 4.00

*Less than ½ of 1% sulphur.

Pacific Export Market

(Quotations are at seaboard, Los Angeles, in cargo lots, cents per gallon, except where otherwise noted.)

	Apr. 28	Apr. 21	Apr. 14
Gasoline, U. S. Motor, 53-55 Gravity	6.00 – 7.00	6.00 – 7.00	6.00 – 7.00
Gasoline, U. S. Motor-blends and special cuts	7.25 –10.00	7.25 –10.00	7.25 –10.00
Gas Oil, 30-34, per barrel	$0.80 –$1.05	$0.80 –$1.05	$0.80 –$1.05
Diesel Oil, 27 plus, per barrel	$0.75 –$1.00	$0.75 –$1.00	$0.75 –$1.00
Bunker oil, 14-18, per barrel	$0.65 –$0.85	$0.65 –$0.85	$0.65 –$0.85
Fuel oil, 14-18 per barrel	$0.60 –$0.85	$0.60 –$0.85	$0.60 –$0.85
Kerosene, 38-40 w.w., 125-150 flash, per gal.	5.00 – 6.00	5.00 – 6.00	5.00 – 6.00
Cased Goods			
Gasoline, U. S. Motor	$1.75 –$1.85	$1.75 –$1.85	$1.75 –$1.85
Kerosene, 38-40 w.w., 125-150 flash	$1.45 –$1.50	$1.45 –$1.50	$1.45 –$1.50

†**Note:** Above Pacific Export market prices for gasoline and kerosene in cargo lots apply only on goods for coastwise shipment. Gasoline and kerosene prices for shipment to foreign ports are determined as follows: Difference in freight between U. S. Gulf to European Continent and California to European Continent —this difference plus 0.125c for handling, deducted from prices posted at U. S. Gulf by the Export Petroleum Assoc., Inc., which are above prices.

Tanker Rates

(Approximate tanker freight rates to Continental ports, in shillings per ton of 2240 pounds, British sterling; to American ports, cents per barrel.)

	Apr. 28 Crude &/or Fuel	Refined Oil &/or Spirits
Calif. to U. K. or Continental ports*	40	42/6
Gulf to U. K. or Continental ports*	26-28	30-32/6
North Atlantic to U. K. or Continental ports*	23/6-25	27-29/6
Calif. to North Atlantic ports (not E. of N. Y.)	$0.90-$1.00	$1.00-$1.10
Gulf to North Atlantic ports (not E. of N. Y.)**	40-45	40

*Continental ports in the range between Bordeaux and Hamburg, both inclusive.

**Venezuela loading same rate. For Tampico 3c to 4c per bbl. addition.

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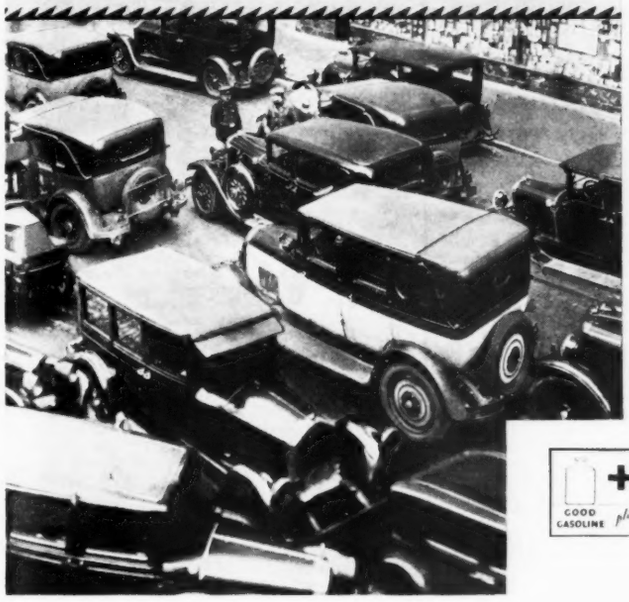

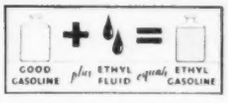

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ETHYL GASOLINE

Tank Wagon, Service Station Markets for Gasoline and Kerosene

(OIL PRICE HANDBOOK has t.w. and s.s. markets for a whole year, arranged for quick reference)

These Prices in Effect Apr. 28, 1930, as Posted by Principal Marketing Companies

S.O. NEW JERSEY TERRITORY

	Gasoline		Total		Oil
	T.W.	Tax	T.W.	S.S.	T.W.
Atlantic City, N. J.	14.5	2	16.5	18.5	13.5
Newark, N. J.	13.5	2	15.5	17.5	12.5
Annapolis	14	4	18	20	13
Baltimore, Md.	13.2	4	17.2	19.2	10.5
Cumberland, Md.	15	4	19	21	14
Washington, D. C.	13.7	2	15.7	17.7	12.7
Danville, Va.	14.8	5	19.8	21.8	13.8
Norfolk, Va.	13.3	5	18.3	20.3	12
Richmond, Va.	13.7	5	18.7	20.7	12.7
Roanoke, Va.	15	5	20	21	14
Petersburg, Va.	14.3	5	19.3	21.3	13.3
Charleston, W. Va.	14.5	4	18.5	20.5	12.5
Keyser, W. Va.	15.1	4	19.1	21.1	14.1
Parkersburg, W. Va.	13.2	4	17.2	19.2	11.2
Wheeling, W. Va.	14.4	4	18.4	20.4	12.4
Charlotte, N. C.	14.3	5	19.3	20.3	14.3
Hickory, N. C.	15.8	5	20.8	22.8	14.8
Mt. Airy, N. C.	15.5	5	20.5	22.5	14.5
Salisbury, N. C.	15.7	5	20.7	20	14.7
Charleston, S. C.	13.3	6	19.3	21.3	12.3
Columbia, S. C.	15.2	6	21.2	23.2	14.2

Note: 2c per gallon discount off t.w. price of gasoline to dealers and commercial consumers thru S. O. New Jersey territory.

CONTINENTAL OIL

Denver, Colo.	13	4	17	20	15.5
Pueblo, Colo.	14	4	18	21	15.5
Grand Junc., Colo.	19	4	23	26	19
Casper, Wyo.	15	4	19	22	14
Cheyenne, Wyo.	16.5	4	20.5	23.5	15.5
Butte, Mont.	19.5	5	24.5	27.5	20
Helena, Mont.	19.5	5	24.5	27.5	20
Salt Lake City, Utah	16.5	3½	20	20	17
Boise, Ida.	18.5	5	23.5	26.5	19
Twin Falls, Ida.	18.5	5	23.5	27.5	19
Albuquerque, N. M.	16	5	21	24	17

S. O. CALIFORNIA

			*Plant		
Phoenix, Ariz.	14	4	18	22	20
Los Angeles, Cal.	18.5	3	21.5	24	15.5
Fresno, Cal.	19	3	22	25	17
San Francisco, Cal.	19	3	22	25	15.5
Reno, Nev.	23	4	27	30	19
Portland, Ore.	19.5	4	23.5	26.5	16.5
Seattle, Wash.	19.5	3	22.5	25.5	16.5
Spokane, Wash.	23.5	3	26.5	29.5	20.5
Tacoma, Wash.	19.5	3	22.5	25.5	16.5

Note: 6c per gal. discount to dealers off t.w. price of gasoline to customers taking tank truck delivery, thru S. O. California territory except 1c discount at Phoenix to dealers only.

***Prices in the fourth column represent retail sale prices of gasoline for delivery into fuel tanks of customers' automotive equipment at S. O. California refineries, terminals and district depots as this company operates no retail service stations.**

S. O. LOUISIANA

Little Rock, Ark.	13	5	18	19	13
Alexandria, La.	‡13	4	‡17	17	†14
Baton Rouge, La.	12	4	16	17	†14
Lake Charles, La.	11	*5	16	16	†14
New Orleans, La.	11	*5	16	16	†12
Shreveport, La.	12	4	16	17	†14
Lafayette, La.	13	*5	18	20	†14
Bristol, Tenn.	15	5	20	22	14
Chattanooga, Tenn.	15	5	20	22	13
Knoxville, Tenn.	15	5	20	22	16
Nashville, Tenn.	14	5	19	21	16
Memphis, Tenn.	13	5	18	20	12.5

Note: 2c per gallon discount off t.w. price of gasoline to dealers thru S. O. Louisiana territory.

*****Lake Charles, New Orleans and Lafayette gasoline tax includes 4c state tax and 1c parish tax. New Orleans kerosene price includes 1c parish tax in addition to 1c state tax.

†Kerosene price in Louisiana includes 1c state tax.

‡Alexandria gasoline prices include 1c parish tax.

S. O. KENTUCKY

Ashland, Ky.	15	5	20	21	15
Catlettsburg, Ky.	15	5	20	21	15
Lexington, Ky.	14	5	19	20	14.5
Louisville, Ky.	15	5	20	22	13
Covington, Ky.	15	5	20	21	14.5
Clarksdale, Miss.	14	5	19	21	12.5
Gulfport, Miss.††	16.5	5	21.5	23.5	13
Jackson, Miss.	15	5	20	22	13
Natchez, Miss.	14.5	5	19.5	21.5	13
Vicksburg, Miss.	14.5	5	19.5	21.5	13
Birmingham, Ala.‡‡	17	4	21	23	14.5
Mobile, Ala.‡	14	4	18	18	13.5
Montgomery, Ala.*	17	4	21	23	15
Atlanta, Ga.	15	6	21	23	†15.5
Augusta, Ga.	14	6	20	22	†15.5
Macon, Ga.	14	6	20	22	†14
Savannah, Ga.	13	6	19	21	†14
Jacksonville, Fla.	15	6	21	22	14
Miami, Fla.	16	6	22	23	14
Tampa, Fla.	15	6	21	23	13
Pensacola, Fla.**	13	6	19	21	13.5

Note: Net price of gasoline to dealers is 2c under posted t.w. price thru S. O. Kentucky territory.

*****Local privilege tax of 1 cent on gasoline and ½ cent on kerosene at Montgomery included.

†Georgia kerosene prices include 1c state tax.

******Both tank wagon prices include 1c city tax at Pensacola which went into effect Oct. 15, 1926.

††Both tank wagon prices at Gulfport include Harrison county privilege tax of 2c.

‡Mobile gasoline prices include 1c city tax.

‡‡Birmingham gasoline prices include 1c city tax.

S. O. NEBRASKA

Omaha, Neb.	15.25	4	19.25	21.25	13.25
McCook	16.75	4	20.75	22.75	14.75
Norfolk	15.75	4	19.75	21.75	13.75
North Platte	16.75	4	20.75	22.75	14.50
Scottsbluff	16.75	4	20.75	22.75	14.25

S. O. INDIANA

Chicago, Ill.	15	3	18	19	13
Decatur, Ill.	15.2	3	18.2	19.2	13.1

Latest Changes in Tank Wagon Prices

Gasoline

S. O. New Jersey—S.s. only cut 0.7c, Salisbury, to 20c, **April 19.**

S. O. Ohio—T.w. cut 1c, s.s. 2c, Columbiana county and Saline township, both to 18c, **Apr. 23.**

S. O. Kentucky—T.w. and s.s. up 1c thru territory, **Apr. 22.**

There were a few exceptions to the general advance, among them being s.s. prices at Lexington, Ashland and Catlettsburg, Ky. which were unchanged, and t.w. and s.s. prices at Covington unchanged.

S. O. Louisiana—S.s. only up 1c, Shreveport, to 17c, **Apr. 21.**

S.s. only cut 2c, Alexandria, to 17c, same as t.w., **Apr. 23.**

Magnolia Petroleum—T.w. and s.s. up 1c, Oklahoma City, to 16c and 19c, **Apr. 16.**

T.w. and s.s. up 1c, Texarkana, both to 14c, **Apr. 15.**

S. O. California—T.w. and s.s. prices up from 2 to 4c generally thru territory, except Phoenix, unchanged, **Apr. 22.** California and Nevada points carried in the accompanying tank wagon table were raised 2c, and Oregon and Washington points 4c. Discount was changed to 6c per gallon.

Atlantic Refining—S.s. only up 2c, Erie, to 21c, **Apr. 28.**

Kerosene

S. O. New Jersey—Kerosene up 1c, Norfolk, to 12c t.w., **Apr. 22.**

	Gasoline		Total		Oil
	T.W.	Tax	T.W.	S.S.	T.W.
E. St. Louis, Ill.	14.4	3	17.4	18.4	12.2
Joliet, Ill.	15.4	3	18.4	19.4	13.3
Peoria, Ill.	15.2	3	18.2	19.2	13.1
Quincy, Ill.	15.2	3	18.2	19.2	12.9
Indianapolis, Ind.	15.2	4	19.2	20.2	14.2
Evansville, Ind.	15	4	19	20	14
South Bend, Ind.	15.4	4	19.4	20.4	14.4
Detroit, Mich.	15.8	3	18.8	19.8	14.7
Grand Rapids, Mich.	15.7	3	18.7	19.7	14.6
Saginaw, Mich.	15.9	3	18.9	19.9	14.8
Green Bay, Wisc.	15.6	2	17.6	18.6	13.4
Madison, Wisc.	15.3	2	17.3	18.3	13.1
Milwaukee, Wisc.	15.1	2	17.1	18.1	12.9
La Cross, Wisc.	16.2	2	18.2	19.2	14
Minneapolis, Minn.	16.2	3	19.2	20.2	13.9
Duluth, Minn.	16.5	3	19.5	20.5	13.9
Mankato, Minn.	16.1	3	19.1	20.1	13.7
Des Moines, Ia.	15.5	3	18.5	19.5	13.3
Davenport, Ia.	15.5	3	18.5	19.5	13.3
Sioux City, Ia.	15.1	3	18.1	19.1	12.9
Mason City, Ia.	15.5	3	18.5	19.5	13.3
St. Louis, Mo.	*14.9	2	16.9	17.9	12.3
Kansas City, Mo.	†15.9	2	17.9	18.9	11.6
St. Joseph, Mo.	†15.5	2	17.5	18.5	12.2
Fargo, N. D.	17.9	3	20.9	21.9	15.9
Grand Forks, N. D.	18.2	3	21.2	22.2	16.2
Minot, N. D.	17.9	3	20.9	21.9	15.9
Pierre, S. D.	16	4	20	21	14.4
Huron, S. D.	16.3	4	20.3	21.3	14.7
Wichita, Kans.	13.8	3	16.8	14.8	11.8
Bartlesville, Okla.	13.5	4	17.5	18.5	11.5

S. O. Indiana's quantity contract price schedule thru territory (except in Chicago and Detroit, which see below) on tank truck deliveries of gasoline, figured from the service station price is 2c for 500 gals. or more a month; 2½c for 2,000 gals. or more a month; 3c for 6,000 gals. or more a month; and 4½c for 100,000 gals. or more a month.

In Chicago and vicinity, these discounts apply: Over 500 gals. per month, 2c per gal. off service station price; over 1,000 gals. per month, 4c per gal. off service station price; over 50,000 gals. per month, 4½c per gal. off s.s. price; over 75,000 gals., 5c off.

In Detroit, dealers and consumers signing contract for all gasoline for one year, get 4c per gal. off s.s. price. Non-contracted accounts get 3c off s.s. price. Those buying 100,000 gals. or more a month, 4½c per gal. off s.s. price.

*****Includes city tax of ½c.

†Includes city tax of 1c.

S. O. OHIO

Ohio state-wide	15	4	19	20	13
Columbiana, †Darke, Hancock, Licking, Muskingum, Preble and Scioto Counties:	14	4	18	18	†13
Athens County	12	4	16	16	13

Note: Discount to dealers and commercial accounts generally thru Ohio is 2c per gal. off t.w. price with some exceptions. In counties where prices are below normal, discount is 3c per gal. off t.w. price.

†Kerosene t.w. price in Darke County is 11c; in Paulding County 12c.

MAGNOLIA PETROLEUM

Muskogee, Okla.	12	4	16	19	10
Oklahoma City	12	4	16	19	10
Tulsa, Okla.	12	4	16	20	10
Fort Smith, Ark.†	11	†4	15	17	12
Little Rock, Ark.	13	5	18	19	13
Texarkana, Ark.*	10	4	14	14	12
Dallas, Tex.	12	4	16	20	12
Fort Worth, Tex.	12	4	16	19	12
Houston, Tex.	11	4	15	19	11
San Antonio, Tex.	11	4	15	19	11
El Paso, Tex.	12	4	16	20	13

*****Within city of Texarkana, the state tax on gasoline is 4c per gal. conforming with the Texas state tax. In this district outside of the city the 5c Arkansas tax applies.

†Within city of Fort Smith, Oklahoma tax of 4c applies. In this district outside of the city, the 5c Arkansas tax applies.

S. O. NEW YORK

Due to local price conditions at many points in S. O. New York territory, actual prices on both gasoline and kerosene are being made at under the posted tank wagon prices published below.

Greater New York City: Boroughs of Manhattan, Bronx, Queens & Kings	13.3	2	15.3	17.3	11.3
Borough of Richmond	13.7	2	15.7	17.7	11.7
Albany, N. Y.	14.6	2	16.6	18.6	12.6
Buffalo, N. Y.	12.8	2	14.8	16.8	11.8
Rochester, N. Y.	13	2	15	17	12
Syracuse, N. Y.	12.8	2	14.8	16.8	12.8
Boston, Mass.	13.5	2	15.5	17.5	11.5
Augusta, Me.	14.8	4	18.8	20.8	12.8
Manchester, N. H.	14.4	4	18.4	20.4	12.4
Burlington, Vt.	15.3	4	19.3	21.3	13.3

Above prices include these inspection fees on both gasoline and kerosene, per gallon: Alabama, 1/40c on gasoline, 1/2c kerosene; Arkansas, 1/20c on both; Florida, 1/8c on both; Illinois, 3/100c on both; Indiana, 4/25c to 1/2c on both; Kansas, 3/50c on both; Louisiana, 1/32c on gasoline; Minnesota, 3/50c on both; Missouri, 3/10c to 1/2c on both; Nebraska, 3/100c on both; North Carolina, 1/4c on both; North Dakota, 1/20c on both; Oklahoma, 4/25c on both; South Carolina, 1/8c on both; South Dakota, 1/10c on both; Tennessee, 2/5c on gasoline and 1/2c to 4/5c on kerosene; Wisconsin, 3/50c on both.

Kerosene inspection fees only, per gallon; Iowa 7/100c; Michigan 1/5c to 4/5c per gal.

Tank Wagon, Service Station Markets for Gasoline and Kerosene

Prices in Effect Apr. 28, 1930

S. O. NEW YORK

	Gasoline T.W.	Tax	Total T.W.	S.S.	Oil T.W.
New Haven, Conn.	14.6	2	16.6	18.6	12.6
Providence, R. I.	13.7	2	15.7	17.7	11.7

Note: S. O. New York allows 3c off t.w. price to dealers in New York City, and 2c off t.w. price thru rest of territory.

ATLANTIC REFINING

Pittsburgh, Pa.	15	*	15	21	13
Philadelphia, Pa.	15	*	15	21	13
Allentown, Pa.	15	*	15	21	13
Erie, Pa.	15	*	15	21	13
Scranton, Pa.	15	*	15	21	13
Altoona, Pa.	15	*	15	21	13
Dover, Del.	15	3	18	20	13
Wilmington, Del.	15	3	18	20	13
Boston, Mass.	13.5	2	15.5	17.5	11.5
Springfield, Mass.	14.5	2	16.5	18.5	12.5
Worcester, Mass.	14.3	2	16.3	18.3	12.3
Fall River, Mass.	14.1	2	16.1	18.1	12.1
Providence, R. I.	13.7	2	15.7	17.7	11.7
Hartford, Conn.	14.5	2	16.5	18.5	12.5
New Haven, Conn.	14.6	2	16.6	18.6	12.6
Atlantic City, N. J.	14.5	2	16.5	18.5	13.5
Camden, N. J.	13.6	2	15.6	17.6	12.6
Trenton, N. J.	14	2	16	18	13
Annapolis, Md.	14	4	18	20	13
Baltimore, Md.	13.2	4	17.2	19.2	10.5
Hagerstown, Md.	14.7	4	18.7	20.7	13.7
Richmond, Va.	13.7	5	18.7	20.7	12.7
Wilmington, N. C.	13.4	5	18.4	20.4	12.4
Brunswick, Ga.	14	6	20	22	**15
Jacksonville, Fla.	14	6	20	22	14

Note: 2c per gal. discount off t.w. price of gasoline on sales to dealers; discount to commercial accounts under contract for one year in accordance with Code of Ethics.

*4-cent state tax is collected by retail dealer and paid by him directly to state.

**Georgia kerosene prices include 1c state tax.

V. M. & P. NAPHTHA

(Changes ordinarily occur coincident with gasoline price changes)

	Oleum Spirits	V.M.&P. Naphtha	Cleaner Naphtha
Chicago	14.7	16.7	17
Detroit	17.4	18.9	20.7
Kansas City	†15.9	†17.4	†19.2
Milwaukee	16.4	*19.9	*21.7
Minneapolis	**20.7	**22.2	**24
St. Louis	15.6	17.1	18.9
New York		16	23
Boston		19	23

*Includes 2c state tax. †Includes 1c city tax.
**Includes 3c state tax.

Petroleum Spirits (Solvent)

Tank Cars (F.o.b. refinery or seaboard terminal)	
New York harbor	11.00
Philadelphia district	11.00
Providence	11.50
Tank Wagon or Steel Barrels	
New York City	18
Syracuse	17–18
Rochester	18
Buffalo	17–18
Providence	19
Boston	19
Bridgeport	16–18
Newark	18
Philadelphia	16
Baltimore	18

Note: 2c off above t.w. prices to large buyers in some instances.

CANADA

(Per Imperial Gallon, which is 1.2 American Gallons)

	ONTARIO T.W.	Tax	Gasoline Total T.W.	S.S.	Oil T.W.
Toronto	19.5	5	24.5	28	20.5
Ottawa	19.5	5	24.5	28	20.5
North Bay	22.5	5	27.5	33	27
Ft. William	22.5	5	27.5	31	22.5
Border Cities, including Windsor	18.5	5	23.5	27	19.5
MANITOBA					
Winnipeg	21.5	5	26.5	30	21.5
SASKATCHEWAN					
Regina	26	5	31	35	26
ALBERTA					
Edmonton	27.5	5	32.5	36	27.5
Calgary	23.5	5	28.5	32	23.5
BRITISH COLUMBIA					
Vancouver	23	5	28	32	24
QUEBEC					
Montreal	20.5	5	25.5	29	21.5
Quebec City	21.5	5	26.5	30	22.5
Three Rivers	21.5	5	26.5	30	22.5
NEW BRUNSWICK					
St. John	20	5	25	29	22
Moncton	20	5	25	29	22
NOVA SCOTIA					
Halifax	20	5	25	29	22
PRINCE EDWARD ISLAND					
Charlottetown	20	5	25	29	22

Note: In districts surrounding these points 1c additional is added to city price.

Aviation Gasoline Prices

Following are tank wagon prices of aviation gasoline in principal marketing territories and showing state and municipal taxes:

S. O. NEW JERSEY

Prices in Effect April 28, 1930

	T.W.	Tax	Total
Newark, N. J.	15.4	2	17.4
Baltimore, Md.	12.5	4	16.5
Washington, D. C.	15.5	2	17.5

*S. O. OHIO

Thru Ohio	17	4	21

*Discounts: For airport delivery only: 2,000 gals. or over per month, 1c per gal.; 6,000 gals. or over per month, 2c; 12,000 gals. and over per month, 3c.

*S. O. INDIANA

Chicago	17	3	20
Indianapolis, Ind.	17.2	4	21.2
Detroit, Mich.	17.8	3	20.8
Milwaukee, Wis.	17.1	2	19.1
Minneapolis, Minn.	18.2	3	21.2
St. Louis, Mo.	16.4	2½	18.9
Kansas City, Mo.	16.9	3	19.9
Fargo, N. D.	19.9	3	22.9
Huron, S. D.	18.3	4	22.3
Wichita, Kan.	15.8	3	18.8

*In S. O. Indiana territory, buyer pays state and city taxes on aviation gasoline, and if he can get a refund from the state, he does so. St. Louis tax of 2½c includes ½c city tax and Kansas City tax includes 1c city tax.

*S. O. LOUISIANA

New Orleans, La.	5	21
Nashville, Tenn.	5	23
Memphis, Tenn.	5	22

*2c per gal. discount off above t.w. prices to dealers and commercial consumers.

S. O. NEBRASKA

*Omaha	4	22.25

*2c per gal. refund to resellers.

CONTINENTAL OIL CO.

*Denver, Col.	16	4	20
Cheyenne, Wyo.	19.5	4	23.5
Helena, Mont.	25.5	5	30.5
Salt Lake City, Utah	20	3.5	23.5
†Albuquerque, N. M.	19	5	24
Boise, Ida.	22	5	27

*1c per gal. discount to dealers at Denver. †2c per gal. discount to dealers at Albuquerque.

*S. O. CALIFORNIA

Phoenix, Ariz.	17	4	21
Los Angeles, Cal.	19.5	3	22.5
San Francisco, Cal.	20	3	23
Reno, Nev.	24	4	28
Portland, Ore.	19.5	4	23.5
Seattle, Wash.	19.5	3	22.5
Spokane, Wash.	23.5	3	26.5

*4c per gal. discount off t.w. price of gasoline to customers taking tank truck delivery, through S. O. California territory, except 1c discount at Phoenix.

Illinois Jobbers' Group Meetings

SPRINGFIELD, Ill.—Group meetings of Illinois Petroleum Marketers that will begin with dinner, continue with discussions of the oil marketers' problems, and end with a motion picture depicting the processes of refining crude oil, are being held regularly.

Chain stores, the gasoline tax and oil inspection laws are discussed at these meetings, according to the April edition of "The Oil Can," official publication of the association.

Meetings to be held the first week of May and the latter part of April include these: May 2, Kaskaskia Petroleum Club, at Vandalia; May 1, Egyptian Petroleum Club, Carbondale; April 30, Illmo Petroleum Club, Belleville; and April 29, Central Illinois Petroleum Club, Carlinville.

Field erected tanks shipped from stock—

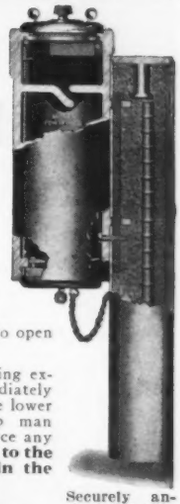
The more common sizes of Horton field erected tanks are shipped from stock and erected quickly by our own erection crews. Capacities range from 25,000 gallons up. Riveted-up cylindrical tanks shipped from Birmingham plant only.

Light oils should be protected from evaporation by equipping tanks with Wiggins Roofs. Ask our nearest office for quotations and full information.

Chicago Bridge & Iron Works

Cleveland - - - 2206 Union Trust Bldg.
New York - - 3145 Hudson Terminal
Philadelphia - - - 1614 Jefferson Bldg.
Boston - 1516 Consolidated Gas Bldg.
Chicago - - - - 2125 Old Colony Bldg.
Detroit - - - - 1513 Lafayette Bldg.
Birmingham - - - 1534 50th Street, N.
Dallas - - - - - 3339 Magnolia Bldg.
Atlanta - - - - - 1050 Healey Bldg.
San Francisco - - - 1060 Rialto Bldg.
Havana, Cuba - - - - Apartado 2507

Stop "Hold Ups"



The Kewanee (Type B-300) two-compartment Safe completely foils the hold-up man who dashes into a station and forces the manager or clerks to open the safe.

For with a Kewanee everything except "change money" is immediately deposited *thru the slot* into the lower compartment. The hold-up man can't open it. Nor can he force any one to open it because **the key to the lower compartment isn't in the station.**

KEWANEE SAFE "OFFICIAL PROTECTION"

Securely anchored in concrete, or to the floor joists, it can't be carried away. And it's immune from the best set of burglar tools ever made.

When the station is closed the upper, change-money compartment is secured with a dial combination lock door, which also "dogs" the lower door so that the door to the lower compartment can't be removed (even with the key) unless the top door is first removed.

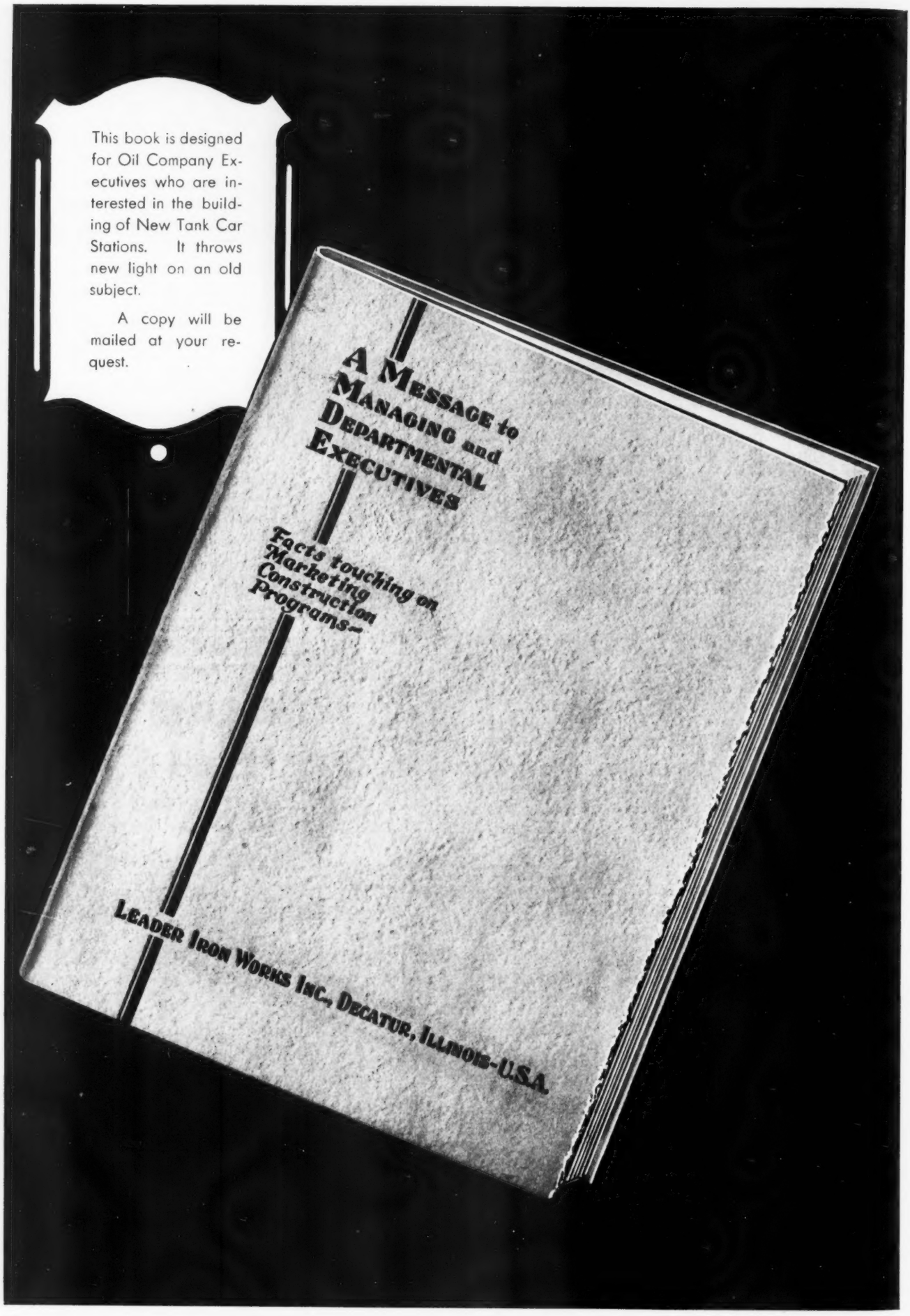
All-Around Money Protection

Listed as Standard by the Board of Underwriters this safe has saved countless dollars from both hold-up men and burglars.

Occupies small space. Can be hidden in a closet or under a counter. Easily installed and **costs less than you are apt to lose in just one hold-up.**

Write for information and prices.

KEWANEE SAFE CO.
4200 Burlington St. KEWANEE, ILL.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A Message to Managing and Departmental Executives
Facts touching on Marketing Construction Programs--
Leader Iron Works Inc., Decatur, Illinois-U.S.A.

Crude Oil Prices (in Effect April 28, 1930)

(Crude prices for the whole year in OIL PRICE HANDBOOK published annually)

EASTERN FIELDS

(Posted by Joseph Seep Purchasing Agency)
(All Penna. Grade Crude Effective Feb. 17, 1930)
†Bradford—Alleghany district.....$3.00
Bradford District Oil in New York Transit Lines (Bradford District).....††$2.75
Bradford District Oil in National Transit Lines (Bradford District).....††2.75
Penna. Grade Oil in National Transit Lines (Other Pennsylvania).....*2.80
Penna. Grade Oil in Southwest Penna. Pipe Lines (Other Pennsylvania)..... 2.75
Penna. Grade Oil in Eureka Pipe Lines (West Virginia)..... 2.65
Penna. Grade Oil in Buckeye Pipe Lines (Macksburg, O. district)..... 2.45
Wayne district crude in Cumberland lines (West Virginia) (Effective Apr. 11, 1930)... 1.34
Corning Grade in Buckeye Pipe Lines (Ohio) (Effective Feb. 17, 1930)..... 1.65
Corning, O., heavy grade (Effective Feb. 17, 1930)..... 1.55
Somerset Oil in Cumberland Pipe Lines (Kentucky) (Effective Apr. 11, 1930).... 1.47
Somerset Oil in Eureka Pipe Lines (Effective Apr. 11, 1930)..... 1.31
Ragland Grade in Cumberland Pipe Lines (Kentucky) (Effective Jan. 29, 1929)....$0.60
*Oil run prior to July 1, 1929 is $2.75 per bbl.
†Posted by Tide Water Pipe Co., Ltd.
††Oil run prior to July 1, 1929 is $2.70 per bbl.

(Posted by Stoll Oil Refining Co.)
Oil City, Ky., oil in Stoll lines (Effective Apr. 18, 1930).....$1.55

MICHIGAN
(Posted by Dixie Oil Co.)

Traverse and Dundee (Muskegon):

32-32.9	$1.08	39-39.9	$1.29
33-33.9	1.11	40-40.9	1.32
34-34.9	1.14	41-41.9	1.35
35-35.9	1.17	42-42.9	1.38
36-36.9	1.20	43-43.9	1.41
37-37.9	1.23	44 and above	1.44
38-38.9	1.26		

(Posted by Pure Oil Co.)
Midland, Midland County.....$1.25

CENTRAL STATES FIELDS
Posted by Ohio Oil Co.
Effective Apr. 11, 1930

Wooster	$1.80	Princeton	$1.65
Lima	1.70	Illinois	1.65
Waterloo	1.20	Plymouth	1.23
Indiana	1.47	West Kentucky	1.55

CANADIAN CRUDE
Posted by Imperial Oil Refineries, Ltd.
Petrolia.....$2.10
Oil Springs..... 2.17

OKLAHOMA, KANSAS and NORTH TEXAS
Prices of Prairie Oil & Gas Co.
(In Oklahoma and Kansas)
Effective Apr. 10, 1930

Below 25	$0.75	35-35.9	$1.255
25-25.9	0.80	36-36.9	1.29
26-26.9	0.85	37-37.9	1.325
27-27.9	0.90	38-38.9	1.36
28-28.9	0.95	39-39.9	1.395
29-29.9	1.00	40-40.9	1.43
30-30.9	1.05	41-41.9	1.465
31-31.9	1.10	42-42.9	1.50
32-32.9	1.15	43-43.9	1.535
33-33.9	1.185	44 and above	1.57
34-34.9	1.22		

(In North Texas: Ranger, Wichita Falls, Mexia)
Effective Apr. 10, 1930

Below 25	$0.72	30-30.9	$1.02
25-25.9	0.77	31-31.9	1.07
26-26.9	0.82	32-32.9	1.12
27-27.9	0.87	33-33.9	1.17
28-28.9	0.92	34-34.9	1.22
29-29.9	0.97	35-35.9	1.255
36-36.9	$1.29	41-41.9	$1.465
37-37.9	1.325	42-42.9	1.50
38-38.9	1.36	43-43.9	1.535
39-39.9	1.395	44 and above	1.57
40-40.9	1.43		

The Texas Co., same schedule in Oklahoma as Prairie in Oklahoma; and in North Texas, North Central Texas and Central Texas as Prairie and Humble in North Texas, effective Apr. 10.

Humble Oil & Refining Co. Prices
(Ranger, North Texas, Mexia, Powell, Boggy Creek, Richland, Wortham, Lytton Springs, Currie, Moran and Nocona crudes all in Texas.)
Humble's prices in above fields same as Prairie's prices in North Texas, effective Apr. 10, which see.

Magnolia Petroleum Co.
(In Oklahoma, Kansas and North and East Central Texas)

Below 26	$0.70	28-28.9	$0.88
26-26.9	0.76	29-29.9	0.95
27-27.9	0.82	30-30.9	1.02

Rest of Magnolia schedule up to 44 and above same as Prairie in Oklahoma and Kansas.
Apr. 10, 1930, Glasscock, Crane, Upton, Winkler, Howard and Mitchell Counties same prices as Humble's postings in Winkler, Crane, etc., which see

Corsicana heavy	$0.80
Luling	0.85
Mirando	0.85
Darst Creek, 60° F. gravity	1.15

Carter Oil Co.
(Oklahoma and Kansas)
Apr. 10, 1930, same schedule as Prairie, which see.

PANHANDLE TEXAS
Humble Oil & Refining Co.
Effective Apr. 10, 1930

Hutchinson and Carson Counties:

Below 32	$0.775	38-38.9	$1.065
32-32.9	0.825	39-39.9	1.10
33-33.9	0.875	40-40.9	1.135
34-34.9	0.925	41-41.9	1.17
35-35.9	0.96	42-42.9	1.205
36-36.9	0.995	43-43.9	1.24
37-37.9	1.03	44 and above	1.275

Gray County:

Below 29	$0.755	37-37.9	$1.16
29-29.9	0.805	38-38.9	1.195
30-30.9	0.855	39-39.9	1.23
31-31.9	0.905	40-40.9	1.265
32-32.9	0.955	41-41.9	1.30
33-33.9	1.005	42-42.9	1.335
34-34.9	1.055	43-43.9	1.37
35-35.9	1.09	44 and above	1.405
36-36.9	1.125		

Wheeler County: Posted by Magnolia Pet. Co. Humble withdrew Wheeler county postings Apr. 10.

Below 30	$0.755	37-37.9	$1.11
30-30.9	0.805	38-38.9	1.145
31-31.9	0.855	39-39.9	1.18
32-32.9	0.905	40-40.9	1.215
33-33.9	0.955	41-41.9	1.25
34-34.9	1.005	42-42.9	1.285
35-35.9	1.04	43-43.9	1.32
36-36.9	1.075	44 and above	1.355

Above prices met by The Texas Co. and Magnolia on Apr. 10.

WEST TEXAS AND NEW MEXICO
Humble Oil & Refining Co.
Effective Apr. 10, 1930

Winkler, Crane, Upton, Crockett, Ector, and Pecos Counties, also Lea County, N. Mex.

Below 25	$0.65	31-31.9	$0.86
25-25.9	0.68	32-32.9	0.89
26-26.9	0.71	33-33.9	0.92
27-27.9	0.74	34-34.9	0.95
28-28.9	0.77	35-35.9	0.98
29-29.9	0.80	36 and above	1.01
30-30.9	0.83		

Howard and Glasscock counties:
Effective Apr. 10, 1930

Below 25	$0.65	31-31.9	$0.82
25-25.9	0.68	32-32.9	0.84
26-26.9	0.71	33-33.9	0.86
27-27.9	0.74	34-34.9	0.88
28-28.9	0.76	35-35.9	0.90
29-29.9	0.78	36 and above	0.92
30-30.9	0.80		

Apr. 10, 1930, The Texas Co. posted same prices in Crane, Upton, Winkler and Lea counties as Humble.

SOUTH AND SOUTHWEST TEXAS
(Posted by Humble Oil & Refining Co.)
Effective Apr. 10, 1930

Mirando	$0.85
Salt Flat	1.15
Darst Creek	1.15
Pettus, Bee County	1.40

NORTH LOUISIANA—ARKANSAS FIELDS
Prices of Standard Oil Co. of Louisiana
Caddo, Homer, Haynesville, Bull Bayou, El Dorado, Crichton, De Soto, and Sabine.
Effective Apr. 11, 1930

Below 28	$0.87	36-36.9	$1.29
28-28.9	0.92	37-37.9	1.325
29-29.9	0.97	38-38.9	1.36
30-30.9	1.02	39-39.9	1.395
31-31.9	1.07	40-40.9	1.43
32-32.9	1.12	41-41.9	1.465
33-33.9	1.17	42-42.9	1.50
34-34.9	1.22	43-43.9	1.535
35-35.9	1.255	44 and above	1.57

Cotton Valley, Sarepta and Carterville below 36 $0.85. Rest of schedule same as Caddo, Homer, etc.

Smackover, below 24	$0.90
do 24 and above	1.05
Bellevue (Apr. 11, 1930)	1.15
*Urania, La. (Apr. 11, 1930)	0.95
†East El Dorado (Calion) (Apr. 11, 1930)	0.90

*Posted by Louisiana Oil Refining Corp.
†Posted by Magnolia Petroleum Co.
Apr. 10, 1930, The Texas Co. same schedule in Louisiana as Standard, plus these grades: 24-24.9, $0.67; 25-25.9, $0.72; 26-26.9, $0.77; 27-27.9, $0.82.
Apr. 11, Magnolia met Standard schedule in Louisiana-Arkansas fields.

STEPHENS, ARKANSAS
Lousiana Oil Refining Corp., and Atlantic Oil Producing Co.
Effective Apr. 11, 1930

Below 28	$0.76	30-30.9	$0.91
28-28.9	0.81	31-31.9	0.96
29-29.9	0.86	32 and above	1.01

GULF COASTAL
Posted by Humble Oil & Refining Co.
Effective Apr .10, 1930

Grades A	$1.15	34-34.9	$1.30
Grades B:		35-35.9	1.33
Below 25	1.00	36-36.9	1.36
25-25.9	1.03	37-37.9	1.39
26-26.9	1.06	38-38.9	1.42
27-27.9	1.09	39-39.9	1.44
28-28.9	1.12	40-40.9	1.46
29-29.9	1.15	41-41.9	1.48
30-30.9	1.18	42-42.9	1.50
31-31.9	1.21	43-43.9	1.52
32-32.9	1.24	44 and above	1.54
33-33.9	1.27		

Refugio county (rest of schedule, same as Grades B, which see above).

Below 25	$0.85
25-25.9	1.03

Fields classified as A and B are Spindletop, Goose Creek, Hull, Liberty, Sour Lake, West Columbia, Orange, Boling, Humble, Pierce Junction, Sugarland and Raccoon Bend. All other fields are Grades A only.
Specifications for Grade "A" crude: Gravity: 25° and below, at 60° F; Viscosity: not less than 100 seconds at 100° F Saybolt.
Sulfur: not over .4%.
Grade "B" includes all Coastal crude which does not meet the test for "A" grades.

Works Tank Cap Racket

MINNEAPOLIS.—A "racket" that took $12 away weekly from service station attendants here, came to a close recently when the racketeer was caught and sentenced to 30 days in the workhouse, according to the American Petroleum Institute.

He worked it by driving to service stations and demanding 40 cents from the attendants for the supposed loss of his gasoline tank cap which, he said had not been replaced when the tank was filled. The attendants paid the money out of their own pockets when the racketeer threatened to report the matter to "my personal friend, your company superintendent."

The story went about from one station attendant to another until it was discovered the racketeer "lost" his tank cap at every station he visited. He was arrested and told the judge that the racket nettled him $12 a week.

TROY, N. Y.—James H. Caldwell, who has been general manager of the Ludlow Valve Mfg. Co. here for 41 years, during 27 of which he was also president, has been elected chairman of the board.

Among other important posts Mr. Caldwell has held, is the chairmanship of the Flange Standardization Committee of the Valve Manufacturers Association.

WASHINGTON—A drop of 529 in shipments of oil burners occurred during February, total shipments amounting to 2940, compared with 3469 burners in January, and 3117 burners in February, 1929.

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Crude Oil Prices (in Effect April 28, 1930)

(Prices are per barrel at the well)

(Crude Oil Prices for the whole year in OIL PRICE HANDBOOK published annually)

GULF COASTAL

Prices of The Texas Co.

Effective Apr. 10, 1930

Grades A.....$1.15 *Grades B.....$1.00

*Grades B include all heavy crudes which do not meet tests for Grades A or for Grades B light crude. Prices for Grades B light crude are the same as Humble's, which see.

ROCKY MOUNTAIN FIELDS

Prices of Ohio Oil Co., and Midwest Refining Co.

(Salt Creek prices effective Apr. 10, 1930)

‡Salt Creek 29–29.9	$1.00
" " 30–30.9	1.05
" " 31–31.9	1.10
" " 32–32.9	1.15
" " 33–33.9	1.185
" " 34–34.9	1.22
" " 35–35.9	1.255
" " 36–36.9	1.29
" " 37 and above	1.325
Elk Basin	1.55
Grass Creek light	$1.55
Big Muddy	1.38
Lance Creek	1.63
Rock Creek	1.35
Mule Creek	1.20
Rex Lake	1.10
‡Osage	1.63
‡Cat Creek, Mont.	1.55
Sunburst, Mont.	1.65
‡Hogback, N. Mex.	1.40
Artesia, N. Mex.	1.05

‡Posted by Midwest Refining Co. Midwest also buys Grass Creek light and Elk Basin.

CALIFORNIA

Standard Oil Co. of California

(Effective March 11, 1930)

Gravity	Signal Hill Seal Beach Alamitos Heights Huntington Beach Inglewood* Olinda-Brea Canon*	Athens Rosecrans Dominguez	Elwood Terrace	Torrance Richfield	Whittier La Habra	Montebello	Coyote	Santa Fe Springs	Newhall McKittrick Kern River	Midway-Sunset Elk Hills Buena Vista Hills Lost Hills	Coalinga	Wheeler Ridge	Kettleman Hills	Orcutt (Santa Maria) (Union Oil Co.)	Santa Paula (Ventura) (Union Oil Co.)	Ventura Avenue (Associated Oil Co.)
14–14.9**	$0.70	....	....	$0.70	$0.70	$0.70	$0.70	....	$0.55	$0.55	$0.55	$0.55	....	$0.55	$0.70	$0.70
15–15.9	.70	....		.70	.70	.70	.70	....	.55	.55	.55	.55	....	.55	.70	.70
16–16.9	.70	....		.70	.70	.70	.70	....	.55	.55	.55	.55	$1.65	.55	.70	.70
17–17.9	.70	....		.70	.70	.70	.70	....	.55	.55	.55	.55	for	.55	.70	.70
18–18.9	.76	....		.76	.76	.71	.76	....	.55	.62	.62	.62	55°	.65	.75	.76
19–19.9	.82	....		.82	.82	.77	.82	....	.55	.70	.70	.70	gravity	.70	.80	.82
20–20.9	.88	....	F. o. b. ship	.88	.87	.83	.87	....	....	.78	.78	.78	and	.78	.85	.88
21–21.9	.94	....		.94	.93	.90	.93	.92	....	.86	.86	.86	over	.90	.90	.91
22–22.9	1.00	....	....	1.00	.98	.97	.98	.95	....	.94	.94	.94	....	.95	.97	.94
23–23.9	1.07	....	....	1.07	....	1.05	1.04	1.01	....	1.02	1.02	1.02	....	1.02	1.05	1.00
24–24.9	1.14	1.14	....	1.14	....	1.11	1.10	1.07	....	1.09	1.07	1.07	....	1.10	1.08	1.07
25–25.9	1.21	1.19	....	1.21	....	1.17	1.16	1.13	....	1.16	1.12	1.12	....	1.18	1.13	1.14
26–26.9	1.28	1.24	....	1.28	....	1.23	1.23	1.19	....	1.23	1.17	1.17	....	1.26	1.18	1.21
27–27.9	1.35	1.29	....	1.35	....	1.29	1.30	1.25	....	1.30	1.23	1.22	....	....	1.23	1.28
28–28.9	1.42	1.34	....	1.42	....	1.35	1.37	1.31	....	1.35	1.27	....	....	....	1.28	1.35
29–29.9	1.46	1.39	....	†1.46	....	1.38	1.41	1.37	....	1.41	1.31	....	....	....	1.33	1.39
30–30.9	1.50	1.45	....	†1.50	....	1.41	1.45	1.43	....	1.47	1.35	....	....	....	1.39	1.43
31–31.9	1.55	1.51	....	....	....	....	....	1.49	....	1.53	1.39	....	....	....	1.45	1.48
32–32.9	1.60	1.57	....	....	....	....	....	1.55	....	1.59	1.43	....	....	....	1.51	1.53
33–33.9	....	1.64	....	....	....	....	....	1.60	....	1.65	1.47	....	....	....	1.58	1.59
34–34.9	....	1.71	1.32	....	....	....	....	1.65	....	††1.71	1.51	....	....	....	....	1.65
35–35.9	....	1.78	1.39	....	....	....	....	1.70	....	††1.77	1.55	....	....	....	....	1.71
36–36.9	....	1.84	1.46	....	....	....	....	1.75	....	....	....	....	....	....	....	....
37–37.9	....	1.90	1.53	....	....	....	....	1.80	....	....	....	....	....	....	....	....
38–38.9	....	1.96	1.60	....	....	....	....	1.85	....	....	....	....	....	....	....	....
39–39.9	....	2.02	1.66	....	....	....	....	1.90	....	....	....	....	....	....	....	....
40–40.9	....	2.08	1.72	....	....	....	....	....	....	....	....	....	....	....	....	....
41–41.9	....	2.14	1.78	....	....	....	....	....	....	....	....	....	....	....	....	....
42–42.9	....	2.20	1.84	....	....	....	....	....	....	....	....	....	....	....	....	....

*Inglewood prices run only to 28.9 gravity; Olinda-Brea Canon to 31.9 gravity.
†Richfield crude only. ††These two grades apply on Lost Hills only.
**Standard does not contract for crude testing below 14 gravity, but pays 45c per barrel when purchased

REFINERS' and COMPOUNDERS' SUPPLIES

Following are average market prices for materials used by refiners and compounders effective on the date shown.

Refiners' Supplies

	Apr. 28	Apr. 21
Soda Ash light 58% bags, cwt.	$1.32	$1.32
Silicate of Soda 60 deg. drums, ...cwt.	$1.55	$1.55
Silicate of Soda 40 deg. tank cars....cwt.	$0.60	$0.60
Silicate of Soda 40 deg. drums ....cwt.	$0.80	$0.80
Sal Soda wks.	$1.00–1.05	$1.00–1.05
Caustic Soda 76% solid, cwt...	$2.90	$2.90
Sulfuric Acid 60 deg. tank cars, f.o.b. shipping point per ton	$11.00	$11.00
Oleum 20%, fuming sulfuric, tank cars, wks.	$18.50	$18.50
Sulfur, flowers of....cwt.	$3.10–4.00	$3.10–4.00
Liquid Chlorine, tank cars, wks....lb.	3.50–5.00	3.50–5.00

Compounders' Supplies

	Apr. 28	Apr. 21
Vegetable Oils		
Linseed carloads, spot....lb.	14.20	14.20
Tanks, spot	13.40	13.40
Soya Bean, Tank, coast, lb.	9.50	9.50
Oleic Acid		
Distilled, tanks....lb.	9.25–9.50	9.25–9.50
Distilled, bbls....lb.	10.125-10.375	10.125-10.375
Saponified, tanks....lb.	9.25	9.25
Saponified, bbls....lb.	10.125–10.625	10.125-10.625
Lard Oils		
Prime Winter Strained....lb.	13.25	13.25
Extra Winter Strained....lb.	11.75	11.75
Extra....lb.	11.50	11.50
Extra No. 1....lb.	11.00	11.00
No. 1....lb.	10.50	10.50
No. 2....lb.	10.25	10.25
Tallow oil....lb.	10.00	10.00
Neatsfoot Oil		
Pure, bbls....lb.	13.00	13.00
Extra, bbls....lb.	11.25	11.25
No. 1 bbls....lb.	11.00	11.00
Cold Pressed....lb.	17.50	17.50
Fish Oils		
Menhaden Oil		
Light Pressed....gal.	63–65	63–65
Light Pressed, tank cars, N. Y....gal.	53	53
White bleached....gal.	67	67
Yellow bleached....gal.	61	61
Whale, extra winter bleached, ...gal.	85	85
Naval Stores		
Steam, distilled turpentine, N. Y....gal.	47	51
Steam distilled turpentine, Savannah....gal.	43	45
Gum turpentine, N. Y....gal.	52	56.50
Gum turpentine, f.o.b. cars Savannah....gal.	46–48	53
Wood Rosin, N.Y....gal.	$6.80	$7.30
Wood Rosin F, Savn'h...bbl.	$5.80	$6.50
Gum Rosin B, N. Y.....bbl.	$6.80	$7.60
Gum Rosin B, f.o.b. cars Savannah....bbl.	$5.90	$6.50
Rosin oil, pure....gal.	58	58
Rosin oil, compounded...gal.	53	58
Pine Tar		
Kiln burnt....bbl.	$13.00–14.00	$13.00–14.00
Retort....bbl.	$13.50–14.50	$13.50–14.50
Alcohol		
Denatured Formula 5, in bbls., per gal....	51–55	51–55

Faith in Employe Stock Buying Plans Unshaken by Market Deflation

CLEVELAND, April 25

THREE-FOURTHS of the total stock subscribed for by employes of the Standard Oil Co. of Indiana in the first two employes' stock purchase plans of that company, was held by the subscribers at the end of 1929, more than eight years after the first offer of stock to employes was made.

"This fact," said the company announcing the fixing of the price of stock for the year which began April 1 at $53 a share, "together with the enthusiasm shown for the third plan, is viewed by the management of the company as convincing proof of the interest employes are taking in becoming part owners in the enterprise. Evidence has appeared in many ways of the greater value to the company of employes who are at the same time stockholders."

Oil companies—chiefly those of the Standard Oil group—seem convinced even after the collapse of the stock market last fall that employe stock participation in the company is good. Faith in the proposal was not shaken although some of the employes were caught in the precipitous fall of stock market prices.

Some of the companies last fall offered financial assistance to those employes who had posted their savings as collateral in buying stocks in the 1929 bull market but the number of employes who sought loans was small.

The Standard Oil Co. of New Jersey made such an offer but only 129 employes sought assistance, the company reported, or less than 0.50 per cent of the subscribers to the third stock buying plan of this company.

"That was interesting," the company said in an editorial in The Lamp after the market collapse. "No less so was the source of the applications (for loans). About 90 per cent originated in the offices at 26 Broadway, indicating that speculation was pretty closely confined to the immediate environs of Wall Street.

"It might be thought that the number who sought company loans was small because the participants either sold their stock previously or lost it when the market crash endangered its value as security. Here again the records offer surprising testimony.

"The New Jersey stock sold during the panic had to be transferred by Nov. 15, the date of the closing of the books for the dividend. When the returns came in from the transfer agent it was learned that the number of employes who sold a percentage of their stock acquisition shares sufficient to make them ineligible for further participation on the plan for a period of one year was just 64. Almost 100 per cent of the employe-stockholders still had their shares when the market turned upward.

"The result is a matter of greatest satisfaction to the company. It indicates that the stock acquisition plan is making good the expectations which led stockholders to approve it. Most of the employes think too much of their stock to involve it in a speculative risk. They have faith in permanency of the business and cannot be easily driven out of their position by a slump in the market price of their shares. Both they and the larger body of outside stockholders are to be congratulated on the manner in which the employe-partner idea has been endorsed."

The Humble Oil & Refining Co., New Jersey controlled, was another that offered company loans to safeguard employe stock, but only 14 availed themselves of the offer, said W. S. Farish, president of Humble.

ASKED whether the stock market collapse might have any effect on employe stock purchase plans of the future, E. G. Seubert of the Standard of Indiana, said:

"We of the Standard Oil Co. of Indiana have not yet discovered any reason to change our belief that the stock purchase plan is a sound method of encouraging employes to take something of the same interest stockholders and management have in effecting economies and increasing efficiency. For the employes themselves it offers opportunity to place savings in an enterprise they know something about and which they can by their own efforts help toward maintenance or betterment of earnings.

"We endeavor in various ways to cultivate the feeling that purchases made under the plan are an investment for the long future and in no sense a money-making venture of short term character. Insofar as this undertaking pervails the stock purchase plan is an influence for thrift and providence rather than an encouragement of speculation. There is no question that many of our employes have today considerable estates in the form of stock certificates which they probably would not have had without the stimulus and aid toward a definite plan of accumulating savings which introduction of our system of stock sharing gave them.

"In any large organization there are bound to be some individuals who are willing to risk their savings in speculation, attempting to obtain quick and large profits. It is possible that such individuals are encouraged in their speculative tendencies through experience in connection with stock purchase plans. But there are today so many influences inviting the man who has a few dollars to venture them in the stock market that he would probably act about the same whether a participant in a stock purchase plan or not.

"THE October-November market collapse has focused a great deal of attention on the small speculator. We believe he is relatively unimportant among the participants in our stock purchase plan. For every participant who may have been influenced toward speculation we believe there are many who have been influenced to save steadily and to accumulate their savings in growing holdings of stock that represent economic security for them and make them better citizens and better employes.

"While the collapse of the market brought to our attention some instances in which employes lost their stock through having used it as collateral on speculative purchases, there was on the whole very little disturbance. Through the crisis our business went on as usual, we did not notice that employes were neglecting their duties to keep in touch with the stock market. Considering the great number of our employes who are participants in the stock purchase plan the lack of uneasiness seemed to indicate that the great majority were in the secure position of holding their stock as an investment which temporary upsets in the market could not affect in the long run.

"Assuming, as we believe, that this was the case, there is certainly no cause to feel that the stock market deflation provided any evidence of failure of the stock purchase plan as a means at the same time of promoting the interests of the company and of the great majority of employes."

The Standard Oil stock purchasing plans generally provide that the com-

(*Continued on Page* 140)

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Transactions in Oil Shares on New York Stock Exchange

1928 High	1928 Low	1929 High	1929 Low	Listed Capital	Par Value	Stocks	Div. Rate	Last Paid	Transactions Week Ended April 26 Sales	First	High	Low	Last	Change
43¾	27½	42⅝	17½	(sh) 992,075	N.P.	Amerada Corp	50cQ	Jan. 31, 30	9,600	26½	27½	25	27½	+ ¾
85	51¼	64¾	12½	(sh) 209,180	N.P.	American Republics Corp	....	.....	8,000	34⅞	35¼	32⅝	32¾	— 2¼
53⅜	37½	47¼	32½	$56,000,000	$25	Associated Oil	50cQ	Dec. 31, 29	210	47¾	48½	47½	48½	+ ½
62½	50	77⅞	30	50,000,000	25	Atlantic Refining	‡25cQ	Mar. 15, 30	66,000	46	48	42	45⅞	— ⅛
53	20	49⅛	20	47,261,125	25	Barnsdall Corp. A	50cQ	Feb. 7, 30	52,000	30⅜	31⅞	29¼	30⅛	— ½
51⅜	20	49	38⅛	300,525	25	do B	50cQ	Feb. 7, 30	.....	....	....	....	....	....
24½	12¼	32⅞	13	(sh) 956,075	N.P.	Beacon Oil	....	.....	5,900	19	20¼	18¾	19⅛	— ⅛
36	25¼	34½	25	$51,524,150	$25	California Petroleum	....	Jan. 1, 29	.....	....	....	....	....	....
....	....	37¾	18	(sh) 4,634,163	N.P.	Continental Oil (Delaware)	....	.....	79,600	29	30½	27⅛	29½	+ 1⅜
94¼	68	94¾	42¼	21,031,400	100	General Asphalt	$1Q	Mar. 15, 30	34,200	67¼	67¼	62¾	63¼	— 3
141	110¼	138	103½	6,628,200	100	do pfd	$1.25Q	Dec. 2, 29	.....	....	....	....	....	....
67	79	109⅜	23	25,000,000	100	Houston Oil	....	.....	106,700	111⅜	116⅞	105¼	113	+ 1⅝
38⅛	21¾	39¼	17¾	(sh) 1,333,157	N.P.	Independent Oil & Gas	50cQ	Jan. 31, 30	37,700	29⅛	30⅞	26⅜	28	— 1⅛
39⅝	9	53	13	$4,299,190	$10	Indian Refining	....	Dec. 15, 20	57,600	23	24	21¾	22¼	— ½
37¼	8½	51¼	11½	4,550,110	10	do ctfs	....	.....	23,800	21¼	21⅞	20⅛	20⅝	— ¼
185	140	165	160	1,977,700	100	do pfd. new	$1.75Q	Jan. 1, 30	.....	....	....	....	....	....
39⅛	27⅛	38⅜	16½	3,992,387	N.P.	Lago Oil & Transport	....	May 2, 27	1,400	24½	25⅜	24½	25	0
119¾	9⅜	18	7	(sh) 1,187,298	N.P.	Louisiana Oil Refining	....	.....	11,200	10	11	9⅞	11	+ ¾
96	78	100¼	80	$4,000,000	$100	do pfd	$1.62½	Feb. 15, 30	10	85	85	85	85	0
25½	12½	18½	5⅛	(sh) 330,000	N.P.	Maracaibo Oil	....	.....	1,800	8	9½	8	9¼	— 1⅛
360	250	295	176	$45,942,800	$100	Mexican Petroleum	$3Q	Jan. 20, 30	.....	....	....	....	....	....
....	....	....	....	12,000,000	100	do pfd	$2Q	Jan. 20, 30	.....	....	....	....	....	....
73	4⅝	69⅜	9¼	(sh) 995,500	N.P.	Mexican Seaboard	....	Nov. 15, 24	143,700	34¼	36¼	32⅛	34½	+ 1
44½	25⅛	39⅞	22⅛	(sh) 1,857,461	N.P.	Mid-Continent	50cQ	Feb. 15, 30	23,400	30¾	32⅜	29⅜	32	+ 1½
120½	103¼	121	120¼	$6,718,000	$100	do pfd	$1.75Q	Dec. 1, 29	.....	....	....	....	....	....
7⅜	2⅜	5⅛	¾	23,849,720	10	Middle States	....	July 1, 23	.....	....	....	....	....	....
5⅛	1½	3⅜	⅛	5,950,500	10	do ctfs	....	.....	4,900	2	2	1¾	1⅞	+ ⅛
2¼	1	1½	⅝	(sh) 3,500,000	N.P.	Pacific Oil	....	.....	5,500	1⅛	1⅛	1⅛	1⅛	0
55½	38¼	69	40¼	$50,000,000	$50	Pan American P. & T	....	Oct. 20, 27	4,000	56	59¼	56	58	+ 2
58⅞	37¾	69¼	40½	121,101,400	50	do B	....	Oct. 20, 27	21,200	58¾	61	56½	59½	+ ⅝
28⅜	15½	17½	13½	(sh) 400,000	N.P.	Pan. American Western B	....	Jan. 30, 27	.....	....	....	....	....	....
21¾	11½	15¼	3	199,370	N.P.	Panhandle P. & R	....	.....	32,400	8¾	11⅞	8¾	10⅛	+ 1⅜
106¼	70	76	47½	$2,935,200	$100	do pfd	....	July 2, 23	200	57	57	57	57	0
53⅞	35¼	47	24¼	(sh) 2,406,803	N.P.	Phillips Petroleum	50cQ	Apr. 1, 30	94,900	39¾	41⅞	38⅛	41½	+ 2⅜
5¼	½	3⅛	1	$29,622,925	$25	Pierce Oil Corp	....	.....	22,700	2⅛	2⅜	2	2¼	+ ¼
50	16¼	51½	20	15,000,000	100	do pfd	....	Feb. 1, 22	5,300	43½	47½	43½	45	+ 1
6⅝	3½	5⅞	½	(sh) 2,500,000	N.P.	Pierce Petroleum	....	.....	168,200	6	7⅛	5⅞	6¾	+ 1
64⅝	59½	65⅝	40½	$60,636,450	$25	Prairie Oil & Gas	50cQ	Mar. 31, 30	4,800	51	51	48½	49½	— 1½
....	....	65	45	101,250,000	25	Prairie Pipe Line	‡75cQ	Mar. 31, 30	7,600	56	56¾	54⅞	54⅞	— 1⅛
29½	16	25⅞	4	37,450,850	50	Producers & Refiners	....	Sept. 15, 23	2,100	10	11⅜	10	11	— ¼
49⅜	41	46¾	25½	2,845,350	50	do pfd	....	May 1, 25	.....	....	....	....	....	....
31¼	19	30¾	20	75,959,255	25	Pure Oil Co	37½cQ	Mar. 1, 30	23,500	25⅝	26	25⅛	25¼	— ½
119	108	116	108	13,000,000	100	do 8% pfd	$2Q	Apr. 1, 30	250	113¾	114	113	113	— ⅜
56	23½	49⅜	20	47,127,725	25	Richfield Oil	50cQ	Feb. 15, 30	31,100	26	26⅞	25½	26	+ ½
....	....	42½	15	(sh) 1,200,000	N.P.	Rio Grande Oil Co	50cQ	Jan. 25, 30	20,100	23⅜	24¾	22⅝	23	— ⅜
64	44⅜	64	43⅛	(sh) 546,646	$13.40	Royal Dutch N. Y. shares	$1.3415	Feb. 5, 30	30,200	54⅜	56⅜	53¾	54½	— ⅜
57½	39⅜	55⅜	22⅝	(sh) 65,203,000	£2	Shell Transport & T	97c	Jan. 28, 30	.....	....	....	....	....	....
39⅜	23½	31⅜	19	12,254,979	N.P.	Shell Union Oil	35cQ	Mar. 31, 30	32,200	24¼	25¼	23⅝	24½	+ ½
27¼	18½	40⅛	15	$8,357,280	$10	Simms Petroleum	40cQ	Mar. 15, 30	40,900	33⅜	35⅜	32	33⅛	— ⅜
46⅞	17⅜	45	21	5,494,095	N.P.	Sinclair Consolidated	50cQ	Jan. 15, 30	111,800	30⅛	31½	28⅝	30	+ ⅛
110	102½	111¾	103	$16,025,200	$100	do pfd	$2Q	Feb. 15, 30	400	....	112¼	112¼	112	+ ½
42⅝	25	46½	28	27,396,590	25	Skelly Oil Co	50cQ	Mar. 15, 30	35,700	39½	41½	37½	39⅛	0
80	53	81⅞	51½	(sh) 13,016,435	N.P.	S. O. California	62½cQ	Mar. 15, 30	111,500	70¼	75	69	74¼	+ 4⅛
59¾	37¾	86⅜	48	$612,095,850	$25	S. O. New Jersey	‡25cQ	Mar. 15, 30	804,900	78⅞	*83⅜	75¾	82⅝	+ 4⅛
45½	28¾	48⅛	31¼	434,094,575	25	S. O. New York	40cQ	Mar. 15, 30	292,400	36½	40	35¼	39⅛	+ 2¾
77	31½	84¾	53	(sh) 1,297,847	N.P.	Sun Oil	‡25cQ	Mar. 15, 30	3,000	67½	68⅜	67	68	+ 1
110	110	105½	100	$5,000,000	$100	do pfd	$1.50Q	Dec. 2, 29	80	103⅝	104½	103⅝	104	0
14¼	2½	24	5¼	(sh) 1,304,698	N.P.	Superior Oil Corp	....	Dec. 20, 20	15,100	8	8⅜	7½	7¾	— ⅛
74⅝	50	71⅞	50	$211,082,925	$25	The Texas Corp	75cQ	Apr. 1, 30	46,800	58	59	57	58	+ ¾
26⅝	12⅛	23⅞	9	8,380,340	10	Texas Pacific Coal & Oil	2½%s	Dec. 31, 29	16,900	12⅛	13⅜	11⅜	12⅜	+ ⅛
41½	19⅝	40	14	(sh) 2,179,275	N.P.	Tide Water Oil Co	20cQ	Mar. 31, 29	400	31	31	31	31	+ 1
100¾	86¾	97½	85⅛	$20,321,000	$100	do 5½% pfd	$1.25Q	Feb. 15, 30	700	94	94	93⅛	94	+ ⅜
25	14¾	23½	10	(sh) 4,877,976	N.P.	Tide Water Associated	30cQ	Feb. 15, 30	38,200	16½	17½	15¾	17	+ ⅝
91¾	81½	90⅞	86¼	$72,989,200	$100	do pfd	$1.50Q	Apr. 1, 30	2,500	86⅞	88	†86¼	87½	+ ¾
14½	6¾	21	5⅛	(sh) 3,842,029	N.P.	Transcontinental Oil	....	.....	319,600	20⅞	24	20⅞	22⅝	+ 1¾
58	42¾	54½	41⅛	$40,858,375	$25	Union Oil of California	‡50cQ	Feb. 10, 30	9,000	47	48¾	46¼	47	— ⅛
128¼	110	163¾	33	31,101,200	100	Union Tank Car Co	$1.25Q	Mar. 1, 30	400	35	35	34⅞	35	— 1
44⅞	26	42⅞	15	(sh) 488,359	N.P.	Warner Quinlan	25cQ	Apr. 3, 30	38,600	22⅞	24⅜	22	22⅝	+ ⅜
38	20⅛	38	25	(sh) 490,000	N.P.	White Eagle Oil & Refining	50cQ	Jan. 20, 30	.....	....	....	....	....	....
22⅛	17¼	29¾	11½	(sh) 428,967	N.P.	Wilcox Oil & Gas	....	May 10, 28	12,900	18½	21	18½	20½	+ 2⅜

*New High †New Low xEx-Dividends ‡Also Extras s-Stock Total Sales 3,075,750

Faith in Employe Stock Buying

(*Continued from Page* 138)

pany contributes $1 for every $2 contributed by the employe toward the purchase of company stock. Prices of the stock are usually set once or twice a year by the directors at the average market prices over the preceding quarter of six months.

In the current instance of the Indiana company, the price set is about $5 a share less than the going market. Of the $53 a share price, the employe pays $35.30 out of his earnings and the company pays the remaining one third of the price. About 17,000 Indiana employes are participating in the present or third plan of the company, it announced.

Shell President on Code Committee

ST. LOUIS—U. deB. Daly, president of the Shell Petroleum Corp. has been appointed a member of the national committee on the code, according to an announcement by Henry M. Dawes, Pure Oil Co., Chicago, head of the department of marketing of the American Petroleum Institute. The committee functions in an advisory capacity on code changes and recommendations.

RICHMOND, Va.—Bids on service station leases on the highway running through the Camp Lee military reservation near Petersburg, Va., have been posted by the Virginia State Commission of Game and Inland Fisheries. The bids are to be sent to the quartermaster-general, Munitions Bldg., Washington.

Pittsburgh Stock Exchange

Transactions Week Ended April 25, 1930

	Sales	High	Low	Last	Change
Ark. Nat. Gas	870	15¾	14¾	15½	0
do pfd	849	8	8	8	— ⅛
Devonian Oil	1,859	14¼	10	14	+3½
Leonard Oil	8,200	4⅜	3⅞	3⅞	— ⅛
Lone Star Gas	29,460	56	53	54	— ½
Plymouth Oil	645	26	24⅝	24⅝	—1⅜
Phoenix Oil	3,000	.60	.50	.50	—c.15
Shamrock Oil & Gas	8,907	25⅞	23	24½	+ ½
Shamrock Oil & Gas 6s	$60,000	106¼	103	106¼	+6¼

Pittsburgh Curb Market

Transactions Week Ended April 25, 1930

	Sales	High	Low	Last	Change
Arkansas Gas A	940	15½	14½	15⅜	....

WASHINGTON—Imports of gasoline into Shanghai, China, for 1929 totaled 6,600,000 American gallons and kerosene imports totaled 68,000,000 gallons.

THE OIL INDUSTRY EXCHANGE

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GO GETTER WANTS POSITION with live growing company. Can organize and train salesmen. Thoroughly familiar with all crudes. Have thorough knowledge of blending and compounding of Automotive and Industrial oils that get results. Can organize your engineering department to a degree of efficiency, having had 15 years experience as lubricating engineer on industrial and bus service. Or tank car salesman in the Eastern territory. Salary secondary where future is considered. Married, 40 years of age, willing to go anywhere. Address Box 527.

SALES AND ADVERTISING MANAGER with 8 years advertising and 12 years oil sales direction experience is seeking connection with substantial oil marketing organization. Location immaterial. Address Box 535.

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HIGH QUALITY MOTOR OILS

Are you looking for a sales and marketing manager? Thoroughly experienced in advertising, sales management and sales force training. A technical lubrication engineer with long experience with Pennsylvania Refineries. Qualified in every way to increase sales and render sales helps to distributors. At present employed but looking for a larger field of service. Well known in Eastern territory.

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Firm specializing on Pipe Stills and complete Refinery Installations has opening for experienced designer and estimator. Permanent opportunity for technical graduate possessing initiative, experience and personality.

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DIVISION MANAGER WANTED

A well known marketer in the Pittsburgh District is looking for a man under 40 who has sufficient experience to take over the management of several bulk plants and service stations. Must have some executive experience and be able to bring to his new connection some of his present business.

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Wanted by powerful manufacturing concern in the Middle West an Engineer with training and experience in design and theory of rotary pumps and related hydraulics. Applicant must be qualified to investigate and analyze new designs and be familiar with existing types and their characteristics.

State age, training and experience, also salary expected.

Address Box 528

Situations Open

YOUNG MAN WANTED

Refinery trained. To make fire inspections and call on the Oil Trade. Excellent opportunity for some one with ambition. Apply by letter.

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EXPERIENCED MECHANICAL ENGINEER

For construction and maintenance in 15,000 barrel Oklahoma refinery. Married, graduate preferred. Give full details and snapshot in first application. None other will be considered.

Address: Engineer, c/o National Petroleum News, Tulsa, Okla.

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SECOND HAND SCOTCH MARINE BOILER WANTED, 150 to 250 Horse Power, good condition. Address Box 728, Cushing, Oklahoma.

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Give make, age, capacity, condition, lowest price whether coiled and where located.

Address Box 532

2 TRUCK TANKS WANTED—1 Tank 700 to 900 gallons, 4 compartment. 1 Tank 400 to 500 gallons, for Model "A" Ford. Address Box 534.

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In or near Chicago. Full particulars and detailed description requested in reply.

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LARGE EUROPEAN OIL MARKETING ORGANIZATION require correspondents to work on a brokerage basis in Oklahoma, Texas, California and Pennsylvania oil fields. Must have first class connections with refiners and producers. State full particulars to Box 526.

NEED PARTNER AT REFINERY with small skimming and cracking units. Preferably experienced man in cracking process with $10,000 to $20,000 cash. Address Box 901, Burkburnett, Texas.

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Manufacturer of first rating and with up-to-date facilities is interested in taking over the production and sale of a design of rotary pump of outstanding merit. Inventors and designers communicate.

Address Box 529

Somebody Can Use Your Outgrown Equipment

Tell them all about it through the Oil Industry Exchange. The cost is small. See rates at bottom of page.

Standard Oil Stocks on New York Curb

1928 High	1928 Low	1929 High	1929 Low	Outstanding Capital	Par Value	Stocks	Div Rate	Last Paid	Transactions Week Ended April 26 Sales	First	High	Low	Last	Change
22 3/8	14 7/8	18 3/4	14 1/4	£4,126,460	£ 1	Anglo-American Oil	36c	June 5, 29						
21 1/4	15	18 1/8	12 1/4	.....	....	do certificates	36c	June 5, 29	300	17 1/2	*18 1/8	17 1/2	18 1/8	+ 1/2
20 1/2	14 3/8	18 1/8	11	.....	£ 1	do ctfs. non-voting	36c	June 5, 29	100	18 1/8	*18 1/8	18 1/8	18 1/8	+ 1/8
5	1 1/4	2 1/2	1/2	(sh) 500,000	N.P.	Atlantic Lobos	.....	.....	100	3/4	3/4	3/4	3/4	— 1/4
9 3/4	3 1/4	4 1/8	1	$10,000,000	$50	do pfd	.....	.....	.....	.....	.....	.....	.....	.....
56	44 1/2	46 1/2	23	$1,000,000	25	Borne-Scrymser	$1 S.A.	Oct. 15, 29	.....	.....	.....	.....	.....	.....
76	58	74 1/4	55	10,000,000	50	Buckeye Pipe Line	$1Q	Mar. 15, 30	200	58 1/4	59 1/8	58 1/4	58 1/4	+ 1/4
161	117 1/4	210	130	3,000,000	25	Chesebrough Mfg	‡$1Q	Mar. 31, 30	800	170 1/4	175 1/4	170 1/4	175 1/8	+ 1/8
23	16	29	8 1/8	36,123,350	10	Continental Oil	.....	Dec. 15, 27	800	15	17 1/2	15	17 1/2	+ 3/8
17 1/2	9 1/2	11 3/4	5 3/8	.....	N.P.	Creole Petroleum	.....	.....	3,800	6 5/8	6 3/4	6 3/8	6 5/8	+ 1/8
82	67	95	40	1,500,000	50	Cumberland Pipe Line	$1Q	Mar. 15, 30	350	65	65	60 1/4	65	0
88	64 1/8	70 1/2	42	5,000,000	100	Eureka Pipe Line	$1Q	Feb. 1, 30	.....	.....	.....	.....	.....	.....
13	4 1/4	7	3	16,000,000	100	Galena Signal Oil	.....	June 30, 25	4,800	5 1/4	5 1/4	4 3/4	5	+ 1/8
86	26	90	73 1/2	4,000,000	100	do new pfd	.....	June 30, 26	.....	.....	.....	.....	.....	.....
89 3/4	35	88	71 1/2	2,000,000	100	do old pfd	.....	June 30, 26	130	84 1/2	84 1/2	82 5/8	82 5/8	+ 6 1/4
114 3/4	59 1/4	128	74 1/2	73,685,700	25	Humble Oil & Refining	50cQ	Apr. 1, 30	14,800	115 1/4	118	112 1/2	114 3/8	+ 1/4
290 1/2	176 1/2	340 1/2	260	20,000,000	100	Illinois Pipe Line	$4.50	Mar. 25, 30	.....	.....	.....	.....	.....	.....
104	56 3/4	41	22	(sh) 26,421,768	N.P.	Imperial of Canada	12 1/2cQ	Mar. 1, 30	6,800	28 1/8	28 3/8	27	27 1/8	— 7/8
91 7/8	74 3/8	41 7/8	26	$1,000,000	$10	Indiana Pipe Line	‡50cQ	Feb. 15, 30	800	38 1/2	38 1/2	37 1/2	37 1/2	— 1 1/8
55	35	37 1/2	15	(sh) 14,247,088	N.P.	International Petroleum	25c	Mar. 15, 30	11,800	22 5/8	23 3/4	21 5/8	23	+ 3/8
32 3/4	19 3/4	25 7/8	10 1/2	$6,363,350	12.50	National Transit Co	25cQ	Mar. 15, 30	1,400	19 1/4	19 7/8	19 1/4	19 3/8	+ 1/8
75	38 1/2	85	72	1,000,000	10	New York Transit	‡40cQ	Jan. 15, 30	.....	.....	.....	.....	.....	.....
....	....	....	....	.....	....	do new	.....	.....	500	18	20 1/2	18	20 1/2	+ 4
69	56 1/2	63	40 1/4	2,000,000	50	Northern Pipe Line	$2 S.A.	Jan. 2, 30	50	41	41	41	41	— 1 1/4
83 1/2	58 1/2	79 7/8	64 1/2	60,000,000	25	Ohio Oil Co	‡50cQ	Mar. 15, 30	2,100	71 3/4	74 3/4	69 7/8	74 3/8	+ 3
84	28	44 1/2	18 3/8	10,000,000	25	Penn Mex. Fuel	$1	Dec. 14, 29	1,200	29 7/8	29 7/8	25	27 1/8	— 2 7/8
220	167	50	21 3/8	4,000,000	25	Solar Refining	$1.25 S.A.	Dec. 20, 29	300	21 3/8	21 1/2	†21 3/8	21 1/2	— 3/4
19	12	23 1/2	13	1,000,000	10	Southern Pipe Line	$1	Mar. 1, 30	1,200	17 3/4	20	17 3/4	19 1/8	+ 1/8
71 7/8	36 3/4	60 1/4	35 1/8	30,000,000	25	South Penn Oil	‡50cQ	Mar. 31, 30	4,300	43 7/8	44 1/8	43	43	— 3/8
102	70	70	45	1,750,000	50	South West Pa. Pipe Lines	$1	Apr. 1, 30	50	51 1/4	51 1/4	51 1/4	51 1/4	+ 1/4
95 7/8	70 1/8	63	45	348,175,069	25	S. O. Indiana	62 1/2cQ	Mar. 15, 30	45,500	56 1/2	58 7/8	55 3/4	57 1/8	+ 7/8
27 3/4	15	40	18	8,000,000	25	S. O. Kansas	50cQ	Mar. 15, 30	.....	.....	.....	.....	.....	.....
49	44	46 3/8	29	25,654,516	10	S. O. Kentucky	‡40cQ	Mar. 31, 30	51,800	35 1/4	40 1/2	35	39 1/4	+ 4
54 3/8	39 7/8	50 1/4	40	4,649,225	25	S. O. Nebraska	‡62 1/2cQ	Mar. 20, 30	200	48 7/8	48 7/8	48 1/2	48 1/2	— 1/2
34	71	129	60	14,000,000	25	S. O. Ohio	62 1/2cQ	Apr. 1, 30	1,050	98	100	96	97 1/8	— 1/8
25	116	125 1/2	106	7,000,000	100	do pfd	$1.75Q	Mar. 1, 30	190	119	119	118 7/8	118 7/8	— 1/8
23 1/2	16	18	5 1/8	861,466	25	Swan Finch	30c	Jan. 15, 29	.....	.....	.....	.....	.....	.....
111	72	133 3/4	75	126,154,000	25	Vacuum Oil	$1Q	Mar. 20, 30	15 300	92	94 3/4	89 3/4	94 1/4	+ 2 1/4

*New High †New Low ‡Also Extras.

Independent Oils on New York Curb

1928 High	1928 Low	1929 High	1929 Low	Par Value	Stocks	Transactions Sales	Week Ended April 26 First	High	Low	Last	Change
1 1/2	.53	.72	.125	$5	Amer. Cons. Oilfields	6,700	1/4	1/4	1/8	1/8	— 1/8
9 1/2	3 1/8	8 5/8	1 1/8	N.P.	Amer. Maracaibo	82,600	2 1/2	3 7/8	2 1/4	3 7/8	+ 1 5/8
4 1/2	2 1/4	4 3/4	1	$10	Argo Oil	.....	.....	.....	.....	.....	.....
3 3/4	3 3/8	26	3 3/4	N.P.	Arkansas Nat. Gas	19,100	15 1/8	15 7/8	14 3/8	15 1/4	+ 1/4
....	....	24 3/4	6 1/2	N.P.	do A	91,500	15	15 7/8	14 1/8	14 7/8	— 1/8
....	....	9	4	10	do pfd	12,600	7 7/8	8	7 7/8	8	0
55	32 3/4	70	50	N.P.	British American Oil	.....	.....	.....	.....	.....	.....
23 7/8	3 3/4	4 7/8	7/8	25c	Carib Syndicate	2,800	1 1/2	2 3/4	1 1/2	2 3/4	+ 1 3/8
....	....	68 5/8	20	N.P.	Cities Service new	348,100	41 7/8	44 1/4	41 1/8	43 1/8	+ 1/2
103 1/2	94 1/2	99 1/4	84	100	do pfd	2,200	92 3/4	93 3/8	92 1/4	92 7/8	— 1/8
9 5/8	8 7/8	9 1/4	8	10	do pref. B	400	8 7/8	9	8 3/8	8 7/8	+ 3/8
97	88 1/2	96	81	100	do pref. BB	.....	.....	.....	.....	.....	.....
2 1/4	1	1 1/2	1/4	1	Colombia Syndicate	27,200	1/2	5/8	3/8	5/8	+ 1/8
17 3/4	9 1/4	15	3 7/8	N.P.	Colon Oil	2,800	7 3/8	7 3/8	6 3/4	7	— 1/4
8 1/8	6 1/4	11 1/8	2 1/2	10	Consolidated Royal	1,100	4	4	3 7/8	3 7/8	— 1/2
....	....	135	42	N.P.	Cosden Oil Co	2,800	58 1/4	60 1/2	55	57	— 3 1/4
....	....	82	55	....	do pfd	200	65	65	65	65	— 5
3 1/4	.76	2 1/2	1/4	N.P.	Crown Central	500	3/4	3/4	3/4	3/4	0
15	6 3/4	11 3/4	4	N.P.	Crystal Oil	.....	.....	.....	.....	.....	.....
50	48	51 1/8	51 1/8	$100	do pfd	.....	.....	.....	.....	.....	.....
33 1/2	8 3/4	26	6 1/2	N.P.	Darby Petroleum	8,900	12 1/8	12 7/8	11 5/8	12	+ 1/8
2 7/8	1	11	2	N.P.	Derby Oil & Refining	8,400	10 5/8	11	9 1/8	9 3/8	— 1 1/8
21 3/4	7 1/2	60	5	N.P.	do pfd	450	60	*60	56	56	+ 2 1/4
165	101 3/4	209	115	$25	Gulf Oil Corp	19,800	159	166	155	164 3/4	+ 8 1/4
7 1/2	5 3/8	7 1/2	1 1/8	5	Homaokla Oil	.....	.....	.....	.....	.....	.....
....	....	53 1/2	5	$1	Indian Territory	47,800	46 1/4	46 3/8	45 3/4	46 1/4	— 1/8
3 3/4	1	2 7/8	1/8	10	Intercontinental Pet	49,800	1 3/4	1 3/4	1 3/8	1 3/8	0
3	1/4	3 3/8	1 1/4	N.P.	Kirby Petroleum	6,400	2 3/4	2 3/4	2 3/8	2 3/8	— 1/2
9 3/8	5 1/2	6 1/8	1	N.P.	Leonard Oil & Dev	39,800	4	4 1/2	3 7/8	4 1/8	+ 1/8
43 3/8	20	38 7/8	18	N.P.	Lion Oil & Refg	2,800	27	28 3/8	27	27	— 1 1/2
....	....	67 3/8	28	N.P.	Lone Star Gas	4,800	55 3/8	55 7/8	53	53 5/8	— 7/8
1 7/8	.50	1 1/4	1/4	1	Magdalena Syndicate	1,400	1/4	1/2	1/4	1/2	+ 1/8
48 1/2	32	38 1/2	12	N.P.	Margay Oil	.....	.....	.....	.....	.....	.....
8	2 3/4	7 1/2	2	N.P.	Mexico-Ohio Oil	400	4 1/2	4 1/2	4 1/8	4 1/8	0
....	....	42	8	N.P.	Missouri-Kan. P. L	9,400	30	30 7/8	29 1/2	30 3/8	+ 3/4
1 1/4	.76	1 1/2	1/4	1	Mountain & Gulf	2,800	3/8	3/4	3/8	3/8	— 1/8
28 7/8	19 1/2	22 7/8	7	10	Mountain Producers	800	11 3/8	11 7/8	11 1/8	11 1/2	+ 1/8
....	....	43 7/8	24	N.P.	Nat. Fuel Gas (new)	22,400	33	36 3/4	33	36 1/4	+ 3 3/4
5 3/8	4 1/4	5	2 1/4	5	New Bradford	1,200	3	3	2 7/8	3	— 1/8
5 1/2	3	3 7/8	2 3/4	10	New England Fuel	200	3	3	3	3	— 1/8
11 7/8	7 1/4	9 3/8	2 1/4	1	New Mex. & Ariz	400	5 3/4	5 3/4	5 5/8	5 3/4	+ 1/8
15 1/2	11 1/2	24 1/2	10 1/2	25	New York Petrol	400	11 1/2	11 7/8	11 1/2	11 7/8	+ 3/8
13 1/4	8 1/2	18 1/2	6 1/8	N.P.	North Cent. Texas	400	10	10	10	10	— 1/2
....	....	19 1/4	8 1/8	N.P.	Oil Stock, Ltd. A	700	10 1/4	11 5/8	10 1/4	10 3/4	+ 3/8
....	....	18 1/4	8 1/2	N.P.	do B	.....	.....	.....	.....	.....	.....
26 1/4	20	26 5/8	12 1/8	N.P.	Pacific Western Oil	1,600	17 5/8	18 3/4	16 7/8	18	+ 3/8
6	2 1/4	3 1/2	1/2	N.P.	Pandem Oil	6,700	1 7/8	2	1 3/4	1 3/4	— 1/4
15 5/8	8 1/2	10 1/2	2 1/8	N.P.	Pantepec Oil	1,000	3	3 1/8	2 7/8	2 7/8	0
20	10 5/8	25 1/2	13 1/8	$25	Paragon Refg. B ctfs.	100	13 1/4	13 1/8	†13 1/4	13 1/8	0
....	....	34 1/2	17	N.P.	Petroleum Corp	167,000	25 7/8	29	25 1/2	29	+ 4 3/8
31 1/8	26 1/2	37	22	N.P.	Plymouth Oil	3,000	25 3/8	25 1/2	24	25 1/8	— 3/8
18	8	16	9	25	Red Bank Oil	.....	.....	.....	.....	.....	.....
13	4 1/8	8 1/2	1 1/8	N.P.	Reiter-Foster	4,900	5	5	4 1/8	4 1/4	— 1/4
31 1/2	23 1/4	25 1/2	19	$25	Richfield pfd	100	21 1/2	21 1/2	21 1/2	21 1/2	— 1/8
....	....	29	13	....	Root Refining pfd	400	16	18 1/2	16	18 1/2	+ 3
12	4 3/8	11	3	N.P.	Ryan Consolidated	700	5 7/8	7	5 3/4	6 1/4	+ 3/4
7 1/4	5 1/2	5 7/8	1 1/8	$10	Salt Creek Cons	200	2 1/8	2 1/8	2 1/8	2 1/8	0
35	23 1/4	25 7/8	9	10	Salt Creek Prod	400	14	14 1/4	13 3/4	13 3/4	+ 3/8
3 1/2	1	2 1/2	1/2	5	Savoy Oil	.....	.....	.....	.....	.....	.....
40	27	33 1/8	10	25	Shreveport El Dorado	.....	.....	.....	.....	.....	.....
....	....	24	9	N.P.	Southland Royalty	11,500	11	13 1/8	10 7/8	12 1/2	+ 2
....	....	12	4	N.P.	Sunray Oil	2,800	8	8	7 5/8	8	+ 1/8
....	....	23	7 1/8	N.P.	Texon Oil & Land new	200	11 1/8	11 5/8	11 1/8	11 5/8	— 7/8
22 7/8	13	16 7/8	11 1/8	$10	Tidal Osage	.....	.....	.....	.....	.....	.....
21 1/4	13 1/8	16 1/2	10 1/8	10	do not-voting	.....	.....	.....	.....	.....	.....
93 3/4	75	155	80	100	Transcontinental pfd	.....	.....	.....	.....	.....	.....
74 1/2	18	81 1/4	14	10	Venezuela-Mexico	3,500	14 3/8	16	14 3/8	14 1/2	— 3/8
9 1/8	4 3/4	6 1/2	1 3/8	3	Venezuelan Petrol	2,400	3 1/4	3 3/8	3 1/8	3 1/4	+ 1/8
....	....	66	2 1/4	N.P.	White Star Oil	.....	.....	.....	.....	.....	.....
8 1/4	4 1/2	9 1/4	2	1	Woodley Petroleum	3,800	3	4 3/4	3	3 3/4	+ 1 1/2
3/8	1/4	5 1/8	1/4	25	Y Oil & Gas	3,700	2 1/8	2 1/4	2	2	— 1/8

*New High †New Low

New York Bonds

Week Ending Apr. 25

	High	Low	Last	Change
Assoc. Oil gold 6s	102 1/2	102 1/2	102 1/2	— 1/2
Atlantic Refg. deb. 5s	102	101 3/4	102	0
Cal. Pet. 5s	99 1/2	99 1/4	99 1/2	+ 1/4
Cal. Pet. 5 1/2s	101 3/4	101 3/4	101 3/4	— 1/8
General Pet. 5s	102	101 3/8	101 7/8	— 1/8
Humble Oil & Refg. 5s	101 1/4	100 1/2	101 1/4	+ 1/4
Humble Oil & Refg. 5 1/2s	102	101 7/8	102	0
Pan Amer. P & T 6s	104	103 1/2	104	+ 1/2
Pan Amer. P & T 6s	97 1/2	95	97 1/2	— 1/2
Phillips Pet. 5 1/4s	95 1/4	95	95 1/8	+ 1/8
Pierce Oil deb. 8s	105 1/2	105 1/2	105 1/2	0
Pure Oil 5 1/2s	100 1/4	99 3/8	100	+ 3/4
Richfield Oil Calif. 6s	96 1/2	95 1/4	96	— 3/4
Shell Union Oil 5s	87 1/2	97	97 3/8	— 1/8
Shell Union Oil 5s war	101	100 1/2	100 7/8	+ 3/8
Sinclair Con. Oil 7s	104	103 3/8	103 3/4	0
Sinclair Con. Oil 6 1/2s	102 5/8	102	102 1/2	0
Sinclair Con. Oil 6s D	100 3/4	100 3/8	100 3/4	+ 3/8
Sinclair Con. Crude 5 1/2s	100	99 3/4	100	+ 1/8
Sinclair Pipeline	98 1/2	98	98	— 1/2
Skelly Oil 5 1/2s	97	95	97	+1
S. O. N. J. 5s	103 3/4	102 1/2	102 3/4	— 1/4
S. O. N. Y. 4 1/2s	96 1/2	95 1/4	96 5/8	+ 1/8
Transcontinental Oil 6 1/2s war	103 1/2	101 3/4	103	+1 1/4
Transcontinental Oil 6 1/2s Ex-war	97	96 5/8	97	— 7/8
Union Oil of Calif. 6s A	107 3/4	107 1/4	107 3/4	+1 1/4
Union Oil of Calif. 5s C	100 1/4	100	100	— 1/8
Warner-Quinlan 6s	92	91	91 1/2	+1 1/2
White Eagle Oil 5 1/2s war	108 3/4	106 1/2	108 3/4	+1 3/4

New York Curb Bonds

Week Ending Apr. 25

	High	Low	Last	Change
Beacon Oil 6s '36	107	106 7/8	107	— 1/4
Cities Serv. 5s '66	87	86 3/8	86 3/4	— 3/8
Cities Serv. G. 5 1/2s '42	88 3/4	88 1/4	88 3/8	— 3/8
Cities Serv. G. P. 6s '43	93 5/8	93 1/8	93 1/8	— 1/2
Cont. Oil 5 1/2s '37	96 3/4	96	96 3/4	+ 3/4
Empire O & R 5 1/2s '42	88 1/4	87 3/4	87 3/4	— 1/8
Gulf Oil 5s '37	102 3/8	101	102 3/8	+ 1/8
Gulf Oil 5s '47	102 1/2	101 3/4	101 3/4	— 1/2
Indep. Oil 6s '39	109	105 1/2	105 1/2	— 2 3/8
Pure Oil 5 1/2s '40	97 3/4	97 1/2	97 1/2	0
Sun Oil 5 1/2s '39	102 1/2	101 1/2	101 1/2	— 1/2
Union Oil Calif. 5s '51	99 3/4	99 1/2	99 1/2	0
Valvoline Oil 7s '37	103 1/2	103	103	— 1/2

NEW YORK.—Ethyl Gasoline Corp. moved its offices from 25 Broadway to the new Chrysler Bldg. at 135 East 42nd St., New York City on April 18.

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LOS ANGELES.—Fred A. Worthey has been appointed vice president of the Axelson Aircraft Engine Co. here.